CILLE PHEADAIR

A NORSE FARMSTEAD AND PICTISH BURIAL CAIRN IN SOUTH UIST

Mike Parker Pearson, Mark Brennand, Jacqui Mulville and Helen Smith

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by

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with contributions by

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Front cover: Top image: Excavation of the last longhouse (phase 8) at Cille Pheadair, viewed from the south (photo by Mike Parker Pearson). Lower left: A copper-alloy spiral terminal from phase 7 at Cille Pheadair (photo by Ian Dennis). Lower centre: Two bone crosses from phase 4 at Cille Pheadair (photo by Ian Dennis). Lower right: A comb fragment from phase 3 at Cille Pheadair (photo by Ian Dennis).

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Karen Godden has copy-edited and proof-read all the

monographs on the project's South Uist excavations, and her eagle eye and patience with the fine detail are, as always, much appreciated.

Niall Sharples has been an inspirational colleague, both during the excavation seasons and while we have been writing up the different elements of the years of work on South Uist. We were lucky enough to dig two Norse-period sites at the same time, in the same landscape: this has made the results of each project better than they would have been on their own. Working not exactly together (we tried that at Dun Vulan) but in tandem has enabled us both to better contribute to the overall picture of South Uist and its inhabitants in the Viking Age and Late Norse period, as well as other periods of this island's remarkable archaeology.

1 Cille Pheadair and the Norse period in South Uist

M. Parker Pearson

The machair plain, a zone of shell sand, on South Uist's west coast is known to have been densely settled in prehistory and in the historical period. Some of the first traces of this rich cultural heritage were brought to light by Tom Lethbridge in the early 1950s when he and Werner Kissling discovered numerous ancient settlement mounds on the machair of Cille Pheadair (Kilpheder) township.[1] Cille Pheadair is located in the southern part of South Uist (Figure 1.1), about 6km from its south coast and 1km south of the modern community of Dalabrog (Daliburgh). The low machair plain of the southern end of the island gives way here at Cille Pheadair to a more hummocky terrain with high sandhills and dunes that characterizes the west coast from Cille Pheadair to Cill Donnain, 8km to the north (Ritchie 1967). The machair extends along most of the 33km-long west coast of South Uist and is generally about a kilometre in width east–west.

The site at Cille Pheadair is separated from the peatlands to the east by a former loch that is now dry and drained. In prehistoric times this loch was a cockle strand connected to the open sea through an inlet immediately to the south of Cille Pheadair. The machair here was thus a thin peninsula perhaps as much as 7km long, comparable to the present-day coastline of Baile Sear on the west coast of North Uist.

Although the machair in the southern part of Cille Pheadair township is largely without large hummocks or dunes, it is fronted on its west side by a long coastal dune with a steep west (seaward) face and a gentle eastern slope. The coastal dune is cut by the wind and sea into a vertically-faced sand cliff that runs north–south; a bank of storm-deposited cobbles lies at the base of the sand cliff, with a sandy beach beyond, interrupted by expanses of rock outcrops in the shallow water below the low tide line.

The Norse-period farmstead of Cille Pheadair (Site 66 in the machair survey[2]) was entirely buried beneath this coastal dune, covered by over 3m of windblown sand, so that no part of this deeply buried site was visible on the ground surface for probably many centuries. It had also been thus protected from burrowing by rabbits. About 70m to the south of it, not far from the former inlet to the dry loch, a Pictish burial cairn was similarly buried beneath 2m of coastal dune. After high-tide storms in the winter of 1993/1994 two brothers, Calum and Seumas MacDonald, discovered the Norse-period farmstead site, visible as a 1m-deep sandwich of grey soil and stones between thick layers of white sand, running for a length of about 40m in the sand cliff above the beach.

With a rate of erosion of this coastline estimated at about 20m–25m in 25 years, it was clear that about a metre of the western edge of the site had already been destroyed and the remainder was directly under threat from the sea. Since the provision of sea defences for this particular location, within a much longer eroding coastline, was clearly inappropriate and impractical, a rescue excavation was carried out over a total of five months during the summers of 1996, 1997 and 1998, funded jointly by Historic Scotland and the Universities of Sheffield, Cardiff and Bournemouth. The site has since been entirely destroyed (see Parker Pearson 2012c).

1.1 Previous research in Cille Pheadair township

Kissling and Lethbridge at the Kilpheder wheelhouse

Although the archaeological richness and potential of North Uist's machair coast was demonstrated as early as the turn of the twentieth century by Erskine Beveridge (1911), in contrast South Uist's machair was largely under-researched until the second half of the century. Even the Royal Commission's (RCAHMS) inventory of 1928 recorded just a handful of sites in this zone, compared to the many duns, brochs, church ruins and other sites of the central peatlands and eastern hills.

One of the more remarkable stories of the Uists in the twentieth century is that of Werner Kissling, an émigré German, formerly a diplomat, who had fled Nazi Germany in the 1930s (Russell 1997). He is principally

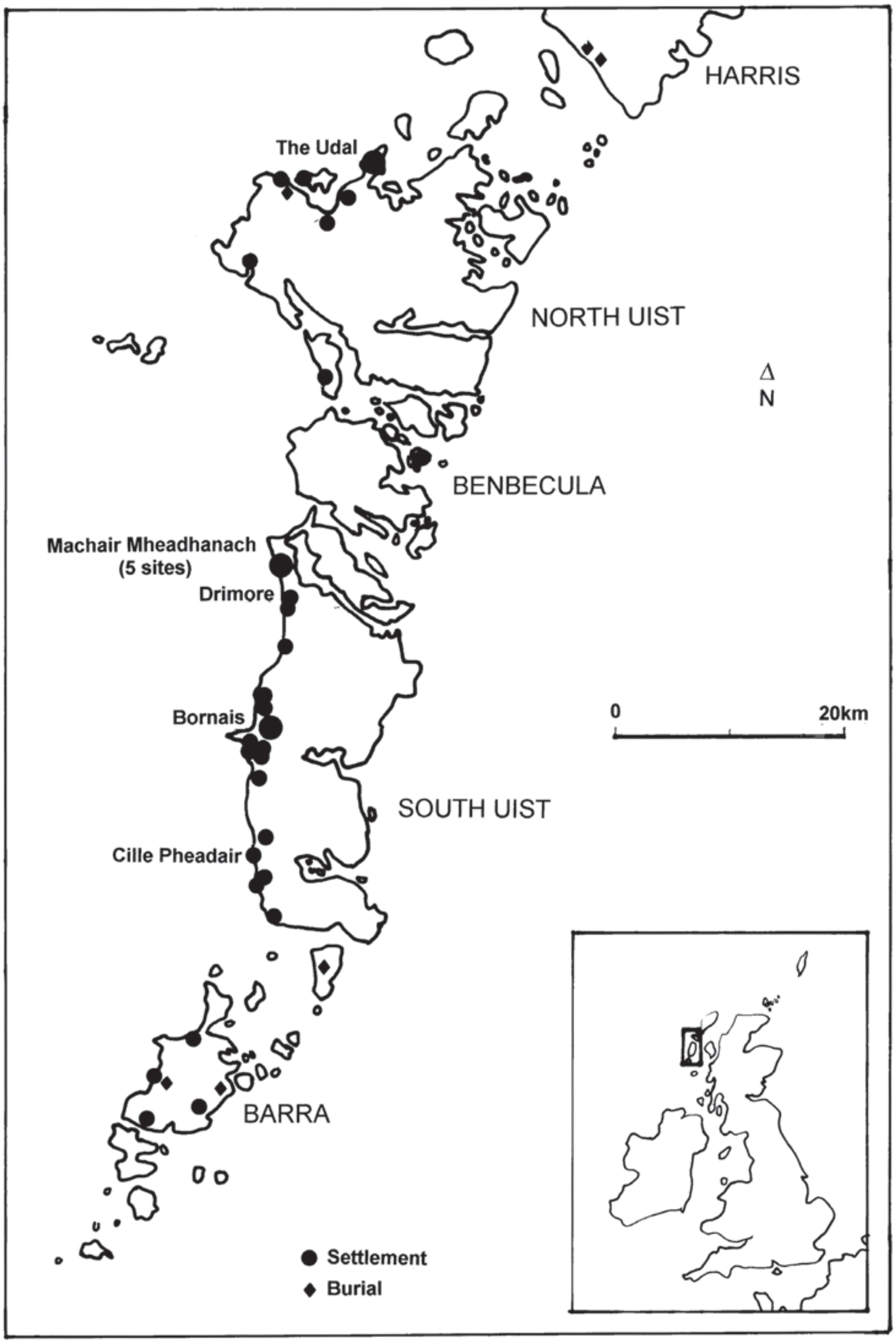


Figure 1.1. Map of the Western Isles, showing the location of Cille Pheadair and other Viking Age and Late Norse sites

remembered for his film of everyday life on Eriskay and for his research into the 'blackhouses' of the Western Isles. Some 'blackhouses' were still being lived in when Kissling arrived in the southern isles in the 1930s, and Kissling was interested both in their stark architecture and in their use in the islanders' economic regime of agriculture and fishing. Kissling was also interested in archaeology, having been interned during the war on the Isle of Man with Gerhard Bersu, one of the greatest German excavators of the day (Evans 1998).

These interests came together when Kissling invited a Cambridge archaeologist, Tom Lethbridge, to come and join him on South Uist. They discovered a large artificial mound (*c.* 5m high, *c.* 80m east–west and *c.* 50m north–south) on Cille Pheadair's machair (Site 63; Parker Pearson 1996b; 2012c). Kissling hoped to encourage the local people to take an interest in their antiquities but his hopes of excavating the buildings inside this mound were dashed when the crofter of this particular piece of land, the late Angus MacClellan, refused permission for a dig. Kissling turned his attention to a second, smaller mound (Site 64) about 400m to the southwest; this mound was

Figure 1.2. Angus John Campbell of Lochbaghasadal (left) and John Robertson of Harrapol standing within the hearth of the Kilpheder wheelhouse (from Lethbridge 1954: pl. 2 [a])

known as Bruthach Sitheanach – 'the Brae of the Fairy Hill' (Lethbridge 1952) – though RCAHMS recorded its name as Bruthach an Tionail Ard.

During the dry spring of 1951 Kissling and Lethbridge noticed that outlines of circular walls could be detected as parchmarks in the grass over this mound. This was one of three circular buildings that Lethbridge identified from parchmarks, confirmed by geophysical earth resistance survey of the mound in 1998 (Parker Pearson 2012c: 50). That summer, which was remembered as being exceptionally hot and dry, Kissling and Lethbridge employed a team of local men, supervised by John Robertson of Harrapol (Skye), to shovel out the deep infill of windblown sand (Figure 1.2). Kissling had extraordinary beginner's luck because the stone walls and piers of the Iron Age 'wheelhouse' that he and Lethbridge discovered inside the mound were entirely intact to the base of the roof, almost 2.5m (8ft) above the floor (Figure 1.3). In no excavation before or since in the Western Isles have archaeologists found buried remains of prehistoric houses so completely preserved.

A Roman brooch found on the ledge of one of the house's wall chambers indicated that the house might have been abandoned around AD 100–150. The excavation also recovered pottery sherds, bone tools and an iron pin fragment from inside the house (Lethbridge 1952). In their styles these artefacts are of types now dated to the Middle Iron Age, between *c*. 200 BC and *c*. AD 400 (Armit 1996: 145–8; Parker Pearson and Sharples 1999: 359; Sharples 2012a: 17).

The following summer, limited excavations continued immediately outside the south side of the wheelhouse to reveal a smaller round building that was joined to the wheelhouse by an underground passage. When the excavation ended the interior void of this round outbuilding was filled in but, unfortunately, the wheelhouse was not. This magnificent roundhouse should have been either reburied or consolidated by shoring and pointing; in the last 60 years, its walls and internal stone piers have largely

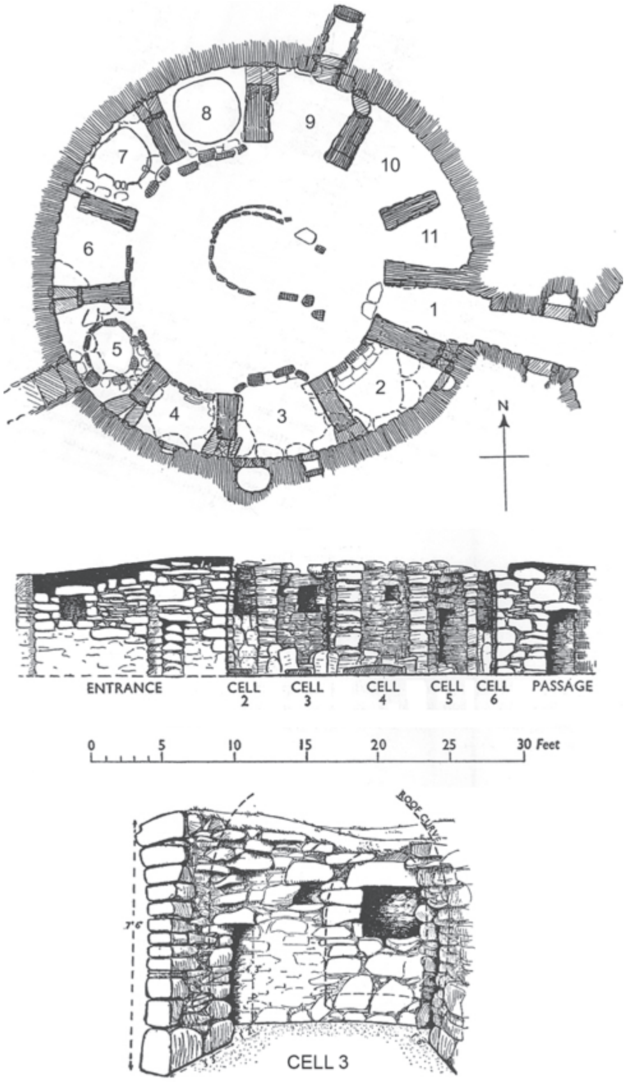


Figure 1.3. Plan and elevation of the Kilpheder wheelhouse (from Lethbridge 1952)

collapsed and the visitor is presented today with a large hole filled with fallen stones. Local opinion today is that the Kilpheder wheelhouse should be consolidated for better public access and understanding.

The 1951 excavation is still remembered by local residents now approaching old age; Kissling himself was evidently a dynamic personality since there are still local memories both of his supervision of the workmen and of the swimming lessons and races he organized for the local children. Tom Lethbridge published the results of the 1951 season in the *Proceedings of the Prehistoric Society* in the following year but, curiously, by the 1990s nobody remembered his presence on the excavations.[3]

The reason why the Kilpheder wheelhouse – and presumably its neighbours within the mound – is so well preserved is worth considering. Every other prehistoric or later house that has been excavated on the machair has been robbed of its stones, mostly in the years immediately after abandonment. In some cases, that robbing is intermittent and partial and in others it is near-total. The reason, no

doubt, is that building stone for any structure had to be brought onto the machair, either from the beach or from the hills some four to ten kilometres to the east. The Kilpheder wheelhouse's fabric consisted of large and partially shaped stones from the hills. This was masonry that would have been highly sought after for building and yet this structure was left intact.

We might speculate, then, that the three houses within this mound were dramatically engulfed by windblown sand and deeply buried before anyone had a chance to remove their stonework. Yet even this scenario seems unlikely, given that Lethbridge records how clean the wheelhouse floor was. He wrote that even the hearth had been swept clean before the house was abandoned (Lethbridge 1952: 180). He later speculated that the clean hearth and floor, together with various artefacts left in wall niches and on the floors of the cells between the piers (an antler pick, a piece of pumice, an awl, a quartzite strike-a-light and a horn ferrule as well as the brooch) indicated that the inhabitants had gone away and never returned (1954: 68–9). Our excavations of other house floors of similar date at Dun Vulan (Parker Pearson and Sharples 1999), Bornais (Sharples 2005d; 2012b), Cill Donnain (Zvelebil 1991; Parker Pearson and Zvelebil 2014) and Cladh Hallan (Parker Pearson *et al*. 2004a: 59–87; in prep.) – where the floors and hearths were anything but swept and clean – reveal that Lethbridge's diagnosis was indeed correct. So how do we explain why the buildings were left untouched?

The Kilpheder wheelhouse appears unusual in that it had its floor and hearth swept and its roof removed before abandonment, being then left untouched until it had been entirely covered with sand. The Roman brooch left on one of the ledges is also unusual because it is one of the very few Roman manufactured goods imported into western Scotland at that time (Armit 1996: 160–1; see Sharples 2012b: 19, 339). At some time in the second century AD, this house – and probably the entire group of wheelhouses in the mound – was abandoned and left untouched. We may speculate about the possible reasons why. Was it a plague house, abandoned after catastrophic illness and death, like one of the nineteenth-century blackhouses at Balnabodach on Barra (Branigan 2005)? Was it a house that had been associated with some unsupportable event or action, such as witchcraft? Perhaps a violent act occurred there or a tragic death such as drowning overtook its inhabitants. Or were the inhabitants driven out because of the loss of their livelihood or through forced relocation?

The mound into which Kissling and Lethbridge were not permitted to dig (Site 63) dates broadly to the same period of the Middle Iron Age as the Kilpheder wheelhouse, on the basis of pottery found during surface survey, although some sherds recovered from Site 63 are of a type found on the floor of the wall chamber at Dun Vulan and dated to between the first century BC and the second century AD (Parker Pearson and Sharples 1999: 92, fig. 4.13.1, 9 and 10), making this mound perhaps slightly earlier than the Kilpheder wheelhouse. Paradoxically (and luckily for Kissling and Lethbridge), it seems from the results of our geophysical survey (Parker Pearson 2012c) that the mound of Site 63 contains no similarly complete buildings.

The long-term settlement sequence at Cille Pheadair before the Viking Age

Lethbridge considered that Kilpheder was just one of nine Middle Iron Age wheelhouses within this particular part of South Uist on Cille Pheadair and Dalabrog machair (1952: 177). Unfortunately his map is at too small a scale and his dots too large for these proposed sites to be relocated precisely. He does, however, provide locations for five of them in the text (*ibid.*: 176). From his descriptions, four of these mounds date to the Middle Iron Age but he seems to have found no dating evidence for the other five. From our own survey and those of others we can now identify a total of 27 prehistoric settlement mounds in this area – 18 on Dalabrog's machair and nine on Cille Pheadair's machair (Figure 1.4; see Parker Pearson 1996b; 2012c).

Although most of the machair is covered by grass, ancient settlement mounds can be identified in unploughed areas by the presence of marine shell (usually limpets and winkles, but also cockles, mussels, *etc.)*, animal bone and sherds in the spoil produced by rabbit burrows and in scoured and eroded areas. Those settlement mounds currently being ploughed also produce similar materials on the surface.[4] In addition to these settlement mounds, there is a stretch of undated field walling on the beach on the Dalabrog/Cille Pheadair boundary (Site 65), a settlement mound identified by RCAHMS but possibly mislocated in their records (Site 80; Parker Pearson 2012c: fig. 2.4), two large mounds within Dalabrog cemetery (Cladh Hallan; Sites 49 and 50), a supposed broch on Loch Hallan that is misidentified by RCAHMS (Site 51), and a group of four undated sherds whose findspot was possibly mislocated by the finder (Site 209; see Parker Pearson 2012c).

The settlement mounds of Dalabrog and Cille Pheadair machair form a north–south arc of sites, bowed on the east, about 3.5km long and mirroring the curve of the coastline on this section of the west coast. Most of the sites lie in a band 200m–500m from the beach although the four sites on the slight promontory in the southern part of Cille Pheadair (Sites 66, 81, 88 and the Pictish cairn) are on the beach or have already been destroyed. This is no doubt because of the significant rate of erosion along this particular kilometre-long stretch of the coastline. It also raises the possibility that unrecorded settlements have disappeared without trace from this southern part of Cille Pheadair, thereby restricting our attempts to place either the Middle Iron Age Kilpheder wheelhouse or the Cille Pheadair Norse-period settlement firmly within a broader landscape and chronological perspective (see Sharples's discussion of the possible loss of early sites closer to the seashore; Sharples 2012b).

The earliest evidence of human activity on the machair in this part of the island is 4000 years old and comes from Dalabrog (Sites 54, 57, 226 and 227). This is one of three concentrations of Early Bronze Age settlements on

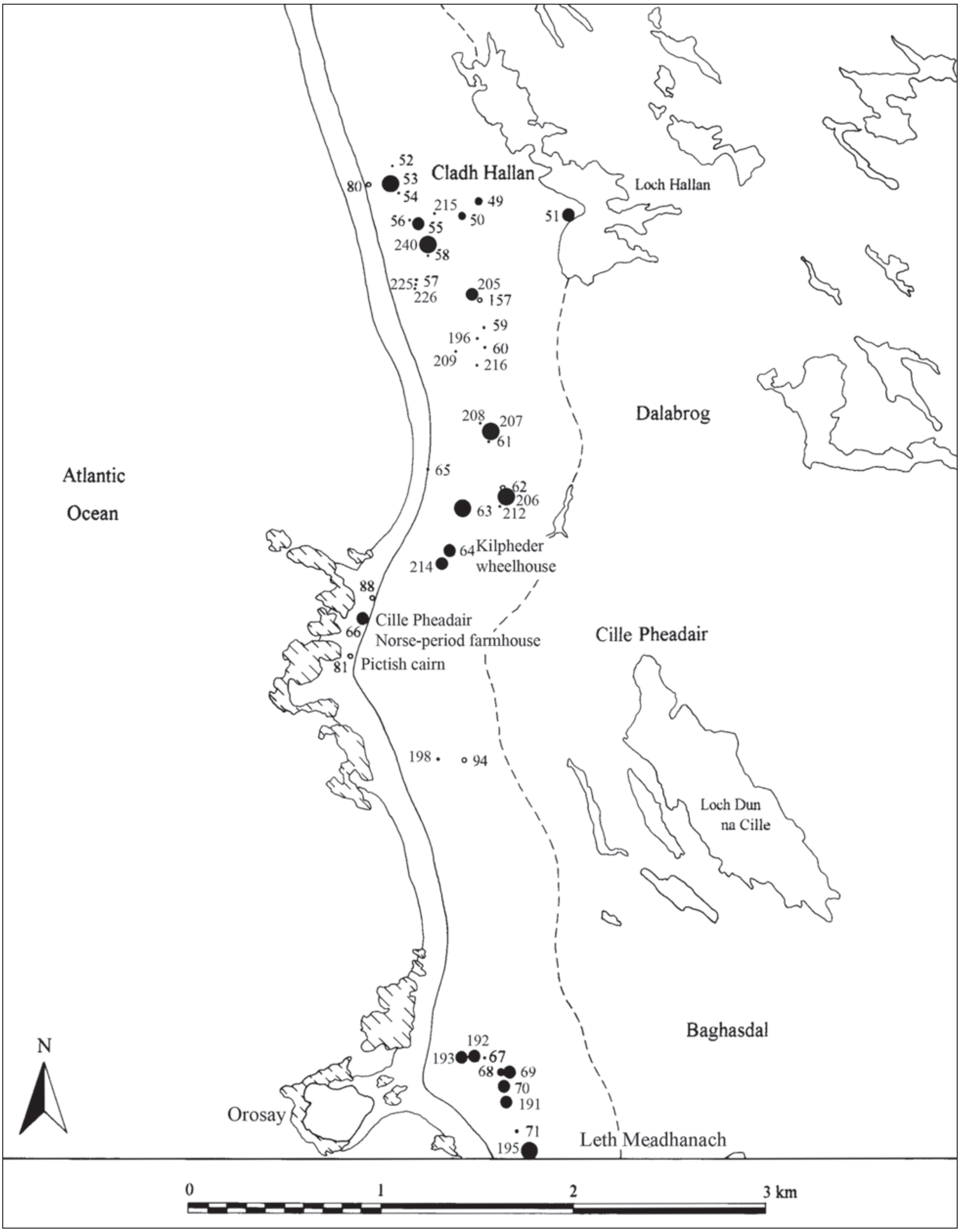


Figure 1.4. The distribution of sites of all periods in the Cille Pheadair/Dalabrog area (the numbering is that used in Parker Pearson 2012c)

South Uist's machair. These were the first settlements to occupy the machair plain once it had formed from marine deposits on the continental shelf during the fourth and third millennia BC (Edwards *et al*. 2005; Ritchie 1966; 1967; 1976; 1979; 1985; Ritchie and Whittington 1994; Ritchie *et al*. 2001).[5] Of course, the Neolithic chambered tombs and traces of settlement indicate that South Uist and the other islands were occupied during these two millennia

(see Cummings *et al.* 2012; Henley 2012; Henshall 1972). In 2005, Niall Sharples recorded a Neolithic site at An Doirlinn, near the tidal island of Orosay south of Cille Pheadair (Sharples 2005a).

From before the period of the wheelhouses, there is a major settlement on Dalabrog machair, north of Cille Pheadair, at Cladh Hallan (Sites 54, 55/56, 53, 215), where roundhouses dating to the Later Bronze Age and Early Iron Age have been excavated (Sites 54 and 55/56; Parker Pearson 2012c: 26; Parker Pearson *et al.* 2004a; 2005; in prep.). Two of the Late Bronze Age houses at Cladh Hallan have porches like that at the front of the Kilpheder wheelhouse.

In contrast, no settlement mounds in Cille Pheadair township have been dated to before the Middle Iron Age. It was this period that witnessed an expansion of settlement along South Uist's machair strip (Parker Pearson 1996c; 2012c: 26–8; 2012d; Parker Pearson and Sharples 1999). As well as the four settlement mounds that have produced Middle Iron Age pottery in Dalabrog (Daliburgh; Sites 58, 60, 157, 205), another (Site 52) may date to this period or later. In Cille Pheadair the two mounds already mentioned (the excavated Kilpheder wheelhouse and the unexcavated Bruthach Sitheanach; Sites 63 and 64) date to this period as does another unidentifiable site to the southeast of Site 63, where Lethbridge found an Iron Age weaving comb (1952: 176). The location of this site is probably signalled by a concentration of shells within a blowout in high dunes about 100m southeast of Site 64. Lethbridge's directions for another settlement mound would place it unfeasibly within the loch basin: he seems to have overestimated the distances between his sites.

Settlements of the so-called Pictish period (or pre-Viking Late Iron Age; *c.* AD 300–900) are often difficult to locate because the pottery of this period is plain and mostly undiagnostic (Lane 1990: 117–23; 2012; 2014: 131–4). Yet fabrics often have a particular wiped surface and certain flaring rims are easily identifiable. A site of this period has been found in Dalabrog (Site 59) whilst a mound adjacent to it (Site 196) probably also dates to the same period. No Pictish-period settlement mounds have been found in Cille Pheadair although it is not impossible that a mound that lies within 100m of Site 63, immediately to its south, dates to this period; so far this has produced only a single undiagnostic sherd (Site 214). Alternatively this may be the site reported by Lethbridge as producing an Iron Age weaving comb.

Other undated sites are one reported by Lethbridge 350m southwest of the wheelhouse (as yet not re-discovered) and a site now washed away (Site 88), which lay 100m north of Cille Pheadair Norse-period farmstead (Site 66).[6] There is also an undated settlement (Site 198/94) a kilometre southeast of Site 66 but in Baghasdal, the next township to the south. So far, there is no positive evidence for any settlement in the Cille Pheadair area after AD 200 until the advent of the Viking Age/Late Norse settlement of South Uist. If Site 214 can be shown unequivocally *not* to date to this period, then we may be able to conclude that none of the settlement mounds found in Cille Pheadair were occupied in the Pictish period (Late Iron Age). There is a very real possibility that Cille Pheadair's machair was not inhabited between AD 200 and AD 900, other than by the dead (though we must heed the caveat of potential loss of settlements to the sea). At some time around AD 700 a woman was buried towards the southern tip of the machair peninsula at Cille Pheadair and her grave was covered by a square cairn of stones. Whether this was a lone grave or part of a larger cemetery is not known. As remarked on earlier and below, this stretch of coastline is extremely vulnerable to erosion; further cairns may well have been washed away by the sea.

Viking Age and later settlement in the Cille Pheadair area

The former loch east of Cille Pheadair's machair, now simply a low-lying area of boggy ground, probably ceased to be a tidal cockle strand in or after the Middle Iron Age.[7] Cockleshells are found in settlement middens of Early and Middle Iron Age date in this area but rarely in settlement scatters of subsequent periods. At Iochdar at the north end of South Uist, cockles occur in the Viking Age/Norse-period settlement mounds as well as in mounds of all other periods, no doubt gathered by generations of inhabitants from the cockle strand between South Uist and Benbecula. Although it is just possible that the people in this part of the island at Cille Pheadair developed a cultural taboo against cockles (but not other shellfish) during the Norse period, it is more likely that the rarity of cockles in middens here indicates an absence of cockles available in the vicinity.

Activity at the Cille Pheadair Norse-period farmstead (Site 66) started in *cal AD 945–1020* (*95% probability*) and ended in *cal AD 1160–1245* (*95% probability*; see Chapter 24). It thus lies within both the Viking Age and the Late Norse periods: for the reader's convenience the farmstead is referred to throughout this monograph as simply 'Norse-period'.

The settlement was located on the eastern edge of a machair sand spit that might have extended 800m–1000m east–west at that time, to just beyond the edges of the rock outcrop that is today visible at low tide. In the southernmost part of these rocks are patches of peat indicating the previous existence here of freshwater lochs that disappeared many millennia ago. Of course, our estimation of the rate of coastal erosion takes no account of potential periodicities and is merely a uniform extension of late twentieth-century observations back over the last thousand years. The process of erosion is also by no means regular since it is only when a storm coincides with a high tide that waves will come far enough up the beach to wash away sand at the base of the sand cliff, creating an overhang that then collapses onto the beach; the fallen sand is taken away by the tide. Such processes will also have been affected by changes in sea level (although we estimate that South Uist's west coast sea level might have risen by only a metre over the last 2,000 years; Parker Pearson and Sharples 1999: 58).

The Viking Age (*c*. AD 790–1050) and Late Norse (*c*. AD 1050–1266) settlements in this part of South Uist appear to indicate a stronger degree of dislocation (in terms of the positioning of settlements) from earlier, Pictish-period settlement mounds than appears to be the case in other parts of the island (Sharples and Parker Pearson 1999). As mentioned above, there is no dated Pictish-period settlement in the vicinity of the Cille Pheadair Norse-period farmstead (even the nearest possible one, Site 214, is 500m to the north; Parker Pearson 2012c). On Dalabrog machair, the two Viking Age/Late Norse settlement mounds (Sites 61 and 207) are located 500m south of a Pictish-period site (Site 59 and possibly Site 196). This pattern of locational discontinuity is at odds with settlement patterns of apparent continuity on the machair at Frobost, Cill Donnain, Bornais, Ormacleit, and Machair Mheadhanach in Iochdar (Parker Pearson 2012b).

The two Viking Age/Late Norse Dalabrog mounds are small, probably single farmsteads, and might have formed a trio with the as-yet undated Site 208. The Cille Pheadair Norse-period farmstead (Site 66) lies between two other lost settlements, washed away by the sea.

- One (Site 81), about 200m to the south, in the vicinity of the Pictish cairn, was recorded by RCAHMS as a midden producing shells, bones and nails. The presence of nails indicates that it is most unlikely to have been inhabited earlier than the Viking Age.
- The other (Site 88), about 100m to the north, was also noted by RCAHMS as a midden with shells, bones and stone structures. Cleaning of the dune face here in 1998 revealed only a few winkle and limpet shells which may be all that has survived from the eastern margins of this site.

Potentially, either site could be contemporary with or later than the farmstead, and Site 88 could possibly be earlier. One of these sites was observed eroding into the sea by Elizabeth Eames over 40 years ago, whilst Site 88 was remembered by Seumas Macdonald from about that time.

No medieval settlements (AD 1266–1500) have been found in Cille Pheadair although there is a settlement with hard-fired red and black early post-medieval ceramics (*c*. AD 1500–1700) on the Cille Pheadair/Dalabrog township border (Site 206). This is partially covered by a large sandhill from whose south side human remains have been recovered (Site 62) during digging of potato clamps. The site is marked on the 1:10,000 OS map as an ancient burial ground. Immediately to the south of Site 206 is the location of an old inn, of which no trace remains. It is remembered in oral histories and is marked on William Bald's map of 1805.

During the excavations at Cille Pheadair we speculated that medieval and early post-medieval Cille Pheadair may lie within the low mounds in the peatlands across the other side of the dry loch from the Norse-period farmstead (Site 66). In 2000 a team led by John Raven dug a series of test trenches into these mounds but only found traces of nineteenth-century occupation in this peatland strip between the dry loch to the west and the loch of Dun na Cille to the southeast (Raven 2005: 481).

Cille Pheadair ('the chapel of St Peter') is mentioned in a variety of medieval and later written sources.

'In 1309 King Robert the Bruce granted ... land in the parish of Kilpedire Blisen' (*Origines* 1851: 366 cited in Macleod 1997: 80). Donald Monro's account of 1549 mentions it as 'Peiter's parochin' (1774 [1934]: 511). 'Kilphedre' also appears on the earliest maps of South Uist, by Timothy Pont in *c*. 1595 and by Blaue in 1654. St Peter's is also mentioned by Martin Martin in 1703 ([1934]: 155). According to Macleod, it was at one time a large and important chapel (1997: 80). This is of particular interest because oral traditions today and historical documents tell of its destruction by the sea; its position was estimated by Calum and Seumas MacDonald as being about 200m–400m off the coast directly opposite the site of the Cille Pheadair Norse-period farmstead.

> 'According to the oldest men [in the seventeenth century] there are destroyed tounes and paroch churches of Kilmarchirmor [Machair Mheadhanach] and Kilpetil [Cille Pheadair], and the church of Kilmonie is now called Kilpetil, that is, the church of the muir, for so it lay of old nearest the muirs, but now the sea and the sands have approached it. There be sum remaynes of the destroyed churches yit to be seen at low tydes or ebbing water.' (*Origines parochiales Scotiae* 1851: 368, cited in Macleod 1997: 83).

Whilst 'Kilmarchirmor' (Machair Mheadhanach) is still to be seen as a large cluster of settlement mounds on Iochdar's machair, it seems that Cille Pheadair's church – and perhaps its medieval settlement too – have vanished beneath the waves. The church of Kilmonie is presumably to be identified with Dun na Cille, the artificial island within Loch Dun na Cille on which there are ruins of a large east–west building with two smaller structures. This crannog is approached by a causeway from the east whereas the smaller undated crannog of Eilean Chreamh, also on Loch Dun na Cille, is approached along a causeway from the loch's west bank (Raven 2012a).

1.2 The Viking Age and the Late Norse period in South Uist

The breakthrough for identifying Viking Age and Late Norse sites on South Uist's machair (Figure 1.5) came in February 1993 when Jim Symonds and I fieldwalked two of the settlement mounds at Bornais (Sites 2 and 3; also known as Mounds 2 and 3), subsequently excavated between 1994 and 2004 by Niall Sharples and his team (Parker Pearson and Webster 1994; Sharples 1996; 1997; 1999; 2000b; 2005d; forthcoming; Sharples *et al*. 1995). Unlike the mound directly south of them (Site 1, or Mound 1; Sharples 2012b), these two mounds had yielded virtually no pottery during fieldwalking in the spring and summer of 1992 even though they were ploughed. We realized that

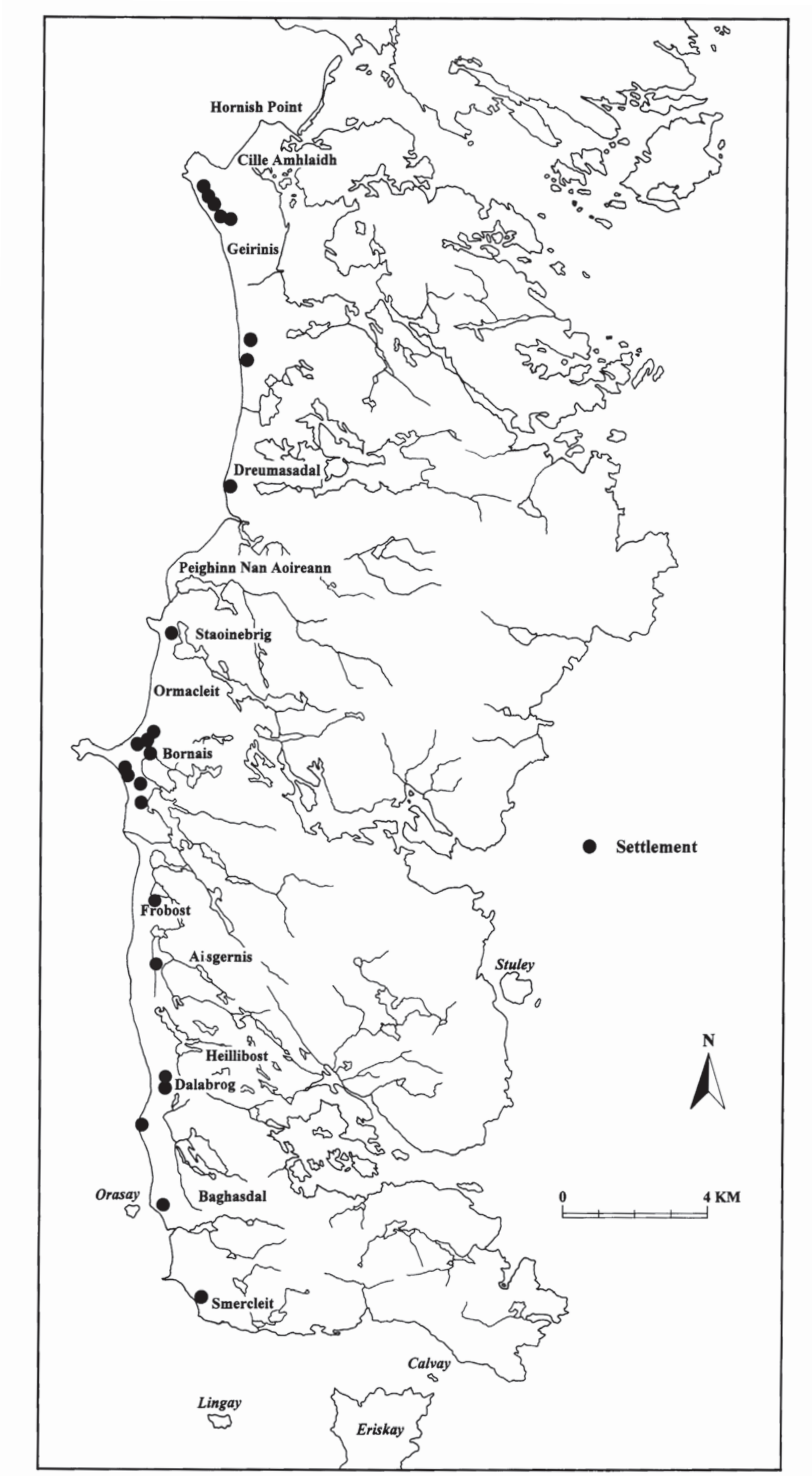


Figure 1.5. The distribution of Viking Age and Late Norse sites and Norse place-names in South Uist

this lack of pottery may be a clue that these large mounds dated to the Viking Age/Late Norse period.

The advantage of fieldwalking in February was that the ploughed surfaces of the mounds as well as the upcasts out of the rabbit holes were scoured so strongly by the wind that sherds would be easier to find. The disadvantage, however, was the wind itself which was so strong that we could only fieldwalk in one direction – into the wind – because we were blown over walking in any other direction. In conditions of bitter cold and driving rain we picked up two small bags' worth of sherds. We took these to the public bar of the Borrodale Hotel that lunchtime and, with frozen fingers, inspected each fragment.

When working on the Udal finds many years before, Alan Lane had identified the diagnostic ceramic type for this period – a flat circular fired-clay platter with grass impressions on the basal side and small holes pierced through from one side to the other. This 'platter ware' formed only 5% of the ceramic assemblage in the Viking Age contexts at the Udal, however, and so we hoped our 30 or so sherds from the Bornais mounds might just have included a sherd or two of platter ware. We were lucky and discovered a small handful. In the years to come, we discovered another 24 settlement mounds with platter ware along South Uist's machair coastline.

Before 1993 the evidence for the Viking Age and Late Norse period in South Uist was thin – only four findspots and two sites for this period were known. A Viking Age/Late Norse bronze pin had been recovered from Bornais machair (near Site 37) and finds of Viking Age/Late Norse date had been recovered from a mound on the machair in Iochdar township (Parker Pearson 2012c). An old find of an antler comb from a stone 'cist' in a sand mound somewhere on South Uist (Grieg 1940) had been interpreted as coming from a burial. Another likely burial assemblage, similarly unprovenanced but including a sword, was found on Eriskay, the small island south of South Uist (which is now joined by a causeway to the southeast tip of South Uist).

Only two Norse-period sites had been excavated in South Uist prior to our project's investigations at Bornais and Cille Pheadair:

- a series of ephemeral structures above the Middle Iron Age wheelhouse of A'Cheardach Mhor (Site 117; Young and Richardson 1960) and
- a Viking Age longhouse at Drimore (Site 103; MacLaren 1974).

Both were identified and excavated in the 1950s as part of a rescue project on the machair in advance of the construction of the rocket range at Geirinis.

The house at Drimore was 14m long east–west, with drystone walls; it dated probably to the late ninth–early tenth centuries (MacLaren 1974). It was an unusual house because the gable wall at the east end ran at an angle rather than being perpendicular to the long side walls; the west end was bowed (Figure 1.6). Only one phase of construction and occupation was identified by the excavators, which makes this structure unusual when compared to the multi-phase

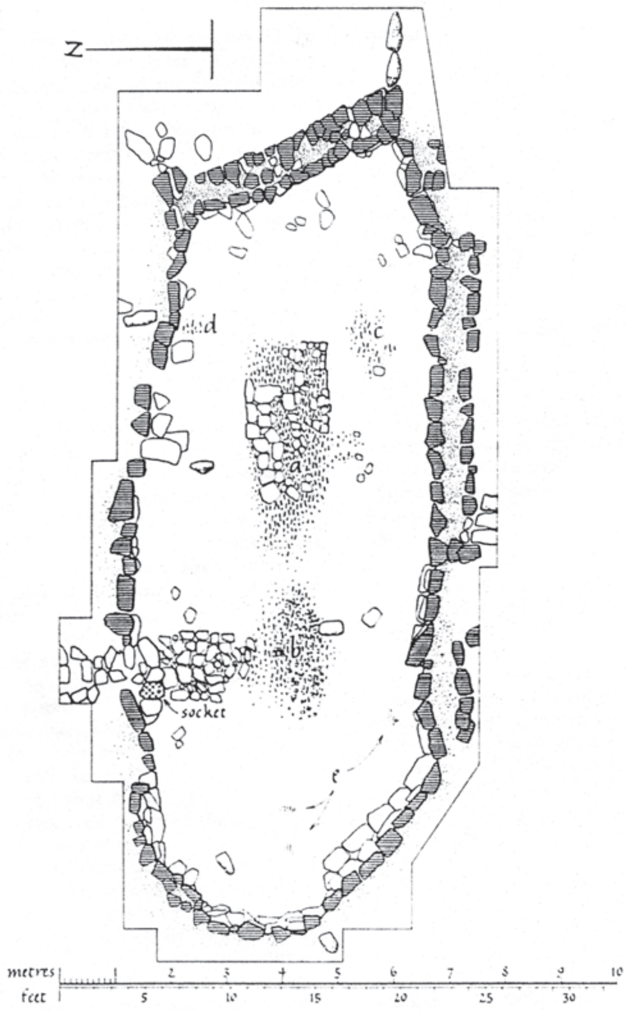


Figure 1.6. The Viking Age house at Drimore (from MacLaren 1974)

houses at Cille Pheadair and Bornais. Finds were few but included steatite artefacts, a silver strip and an antler comb (that provided the dating evidence); there was no pottery, though subsequent surface survey has produced a small assemblage of sherds missed by the excavators (Parker Pearson 2012c).

Twenty-four Viking Age/Late Norse settlement mounds (and four possibles) have now been identified on South Uist's machair, found during fieldwalking between 1993 and 2000. Settlement mounds with Viking Age/Late Norse pottery (Lane 2014: 134–43) or other finds (Figure 1.5) have been identified at:

- Iochdar (Sites 145, 148, 149, 155 and 186),
- Gearraidhfleugh (Site 117; excavated by Young and Richardson 1960),
- Drimore (Site 103; excavated by MacLaren 1974),
- Dreumasdal (Site 99),
- Staoinebrig (Sites ?33 and 34),
- Ormacleit (Site ?6),
- Bornais (Sites 1, 2, 3, 14, 28, ?37 and 40),
- Cill Donnain (Sites ?27, 83 and 84),
- Frobost (Site 238),

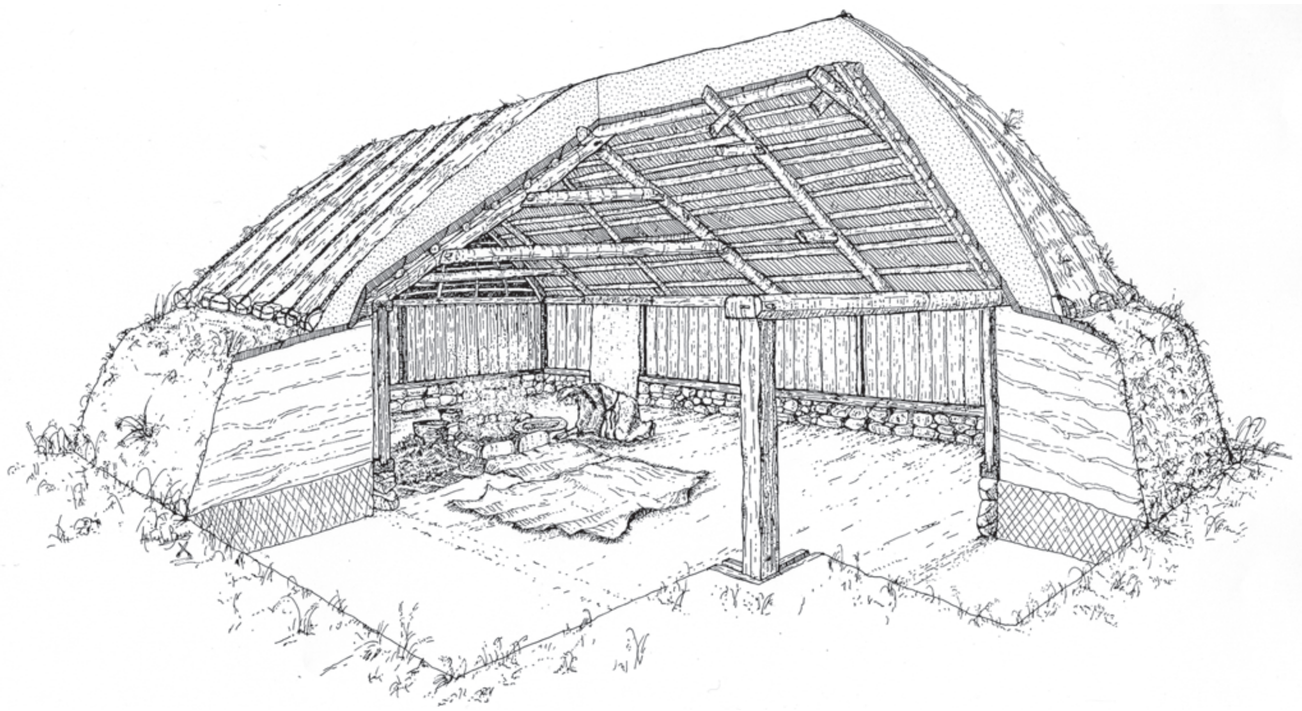


Figure 1.7. A reconstruction of one of the Bornais houses (from Sharples 2005d)

- Aisgernis (Site 48),
- Dalabrog (Sites 61 and 207),
- Cille Pheadair (Site 66),
- Baghasdal (Site 191),
- Smercleit (Site 74).

The range in mound sizes for Viking Age/Late Norse settlements is on the low side in comparison with those of the Late Bronze Age/Early Iron Age and the Middle Iron Age. Nine of the Viking Age or Late Norse mounds are around 15m in diameter or smaller, indicative of single farmsteads like Cille Pheadair or single buildings like Drimore. Others such as Sites 207 and 149 are slightly larger at *c*. 20m–30m diameter, possibly indicating larger establishments. The largest mounds are:

- the two major mounds at Bornais (Sites/Mounds 2 and 3) at *c*. 50m diameter,
- Site 99 on the Howmore/Dreumasdal boundary at *c*. 60m × 20m,
- Site 191 at Baghasdal at 50m × 30m, and
- Site 186 at Machair Mheadhanach in Iochdar at *c*. 35m diameter.

The sizes of at least six mounds are not determined because of their partial covering with sand dunes and we have to be cautious when estimating the dimensions of others because their multiperiod occupation prevents us from distinguishing the extent of Viking Age/Late Norse occupation from that of other periods, but certain conclusions can be drawn.

- The distribution of these four largest settlement mounds is regular: they are spaced 7km–12km apart down the length of the island.
- Baghasdal and Howmore/Dreumasdal had political significance in the later medieval period, the former under the control of MacNeil of Barra and the latter as seat of the Clanranald, including the island castle of Castle Bheagram (see Raven 2012a).
- Machair Mheadhanach was identified by Monro in 1549 as the 'mayne land of the mid contrey' pertaining to Clanranald (Monro 1774 [1934]) and was subsequently a centre of population.
- Bornais is more problematic: it seems to have had little significance in the medieval period and later but it was clearly pre-eminent in South Uist in the Viking Age and Late Norse period as the largest centre of population, not simply on Sites 2 and 3 but also with probable farmsteads on Sites 1, 14, 28 and 37. It might thus have been, in that period only, the social and political centre of the island (see Sharples 2004; 2012b). This interpretation is supported by the discovery of a sequence of hall-sized buildings on Site 2 (Figure 1.7; Sharples 1999; 2000b; 2003; forthcoming; Parker Pearson *et al*. 2004a: 133–7).

Eleven of these 28 known or probable Viking/Late Norse settlement mounds are adjacent to one or more mounds of earlier date (with Middle Iron Age to Pictish-period pottery) (Sites 2, 3, 14, 28, 37, 6, 83, 84, 99, 103, 186). These Norse-period sites thus form part of multi-period mound clusters that are evenly spaced along the machair at about 1km intervals, in a pattern that conforms to the territorial ordering of the pre-Clearance townships (Parker Pearson 1996b; 1996c; 2012c). In addition, a further five have evidence for Pictish/Late Iron Age occupation beneath them (Sites 1, 117, 145, 191 and 238). Two of the Viking/

Late Norse sites (Sites 34 and 74) were subsequently inhabited in the medieval and later periods.

Yet there is also evidence for some degree of spatial dislocation between seven of the Viking Age/Late Norse settlement mounds and their possible pre-Viking predecessors. At Staoinebrig the two Norse-period sites are 500m east of their predecessors; at Dalabrog they are 500m to the south of the sites of earlier periods; and at Machair Mheadhanach three mounds (Sites 148, 149 and 155) are 200m–500m northwest of their likely predecessors.

The peatlands – or 'blacklands' – that cover most of the central north–south strip of South Uist were certainly exploited in the Viking Age/Late Norse period. This zone was probably cultivated and used in the Middle Iron Age (Smith 1999: 336); most of the brochs and a handful of wheelhouse settlements are located in these areas (Parker Pearson and Sharples 1999: 14; Sharples 2012b; Parker Pearson 2012b; Raven 2012b). Despite intensive surveys by Andrew Fleming, John Moreland and Jim Symonds of the peatlands and hills in the centre of the island (see papers in Parker Pearson 2012b), the only evidence for Viking Age/Late Norse settlement in this area is a bronze Norse pin from an early post-medieval context within the settlement of Gearraidh Bhailteas near Cill Donnain (Symonds 2012). However, John Raven's study of duns and crannogs within South Uist's blacklands identifies many as having likely Norse origins (2005: 188–245; 2012a).

On the island of Barra, to the south of the Uists, Viking Age/Late Norse finds including steatite spindle whorls have come from small 'hut' sites in the hills that were probably shielings, temporary summer grazing settlements. One such site lies within a Middle Iron Age wheelhouse at Allt Chrisal (T17) and the other is at Ben Gunnary (Branigan and Foster 2000). There are numerous sites of ancient shielings in the hills of South Uist but none have yet been excavated or firmly dated (Raven 2012b). Although Viking Age/Late Norse seasonally occupied shieling sites and a few settlements may remain to be found in the 'blacklands' and the hills, the main focus for settlement during this period was on the machair (Sharples and Parker Pearson 1999: 48).

In addition to the settlement mounds, there are ancient ecclesiastical sites at:

- Tobha Mor (Howmore; Pringle 1994: 41–2; Badcock 2008: 71–2);
- Cille Bhrighde (West Kilbride) (Site 76);
- Cille Donnain (Site 82; Fleming 2012; Fleming and Woolf 1992; Parker Pearson 2012a);
- possibly Cille Bhanain, built on top of a broch at Geirinis (Parker Pearson 2012c).

Cille Donnain is almost certainly of Late Norse date on the basis of its architectural form although the pottery from secondary deposits later than the church dates to the thirteenth–fifteenth centuries (Parker Pearson 2012a: 290). At least three of these ecclesiastical sites are associated with ancient burial grounds but there are no positively identified pagan or Christian Norse graves or cemeteries in South Uist.

In conclusion, the settlement evidence is now particularly rich. The density of known Viking Age/Late Norse settlements in South Uist is probably greater than anywhere else in Scotland and probably greater than for most regions within the Viking world. Within western Scotland, this is one of the few areas where the study of settlement patterns can rely on evidence more tangible than place-names (*cf* Fraser 1995; Johnston 1995). There is evidence in the mound sizes and spacing for a settlement hierarchy of many single farmsteads, three sub-regional centres, and a regional centre at Bornais.

Although the distribution of settlements along the machair is not even – Bornais and Machair Mheadhanach were relatively densely inhabited – the relatively even spacing of Viking Age/Late Norse settlements and/or Norse-derived township names every 1km–2km along the machair correlates well with the post-medieval arrangements of many of the townships. We have also seen how the majority of these Viking Age/Late Norse settlements are adjacent to or on top of settlement mounds of the Middle Iron Age and Pictish periods, suggesting a strong degree of locational continuity.[8]

The settlement pattern of the Viking Age/Late Norse period differs from that of earlier centuries not in its division of territorial space along the machair but in the emergence of differences in size and probably status between those settlements. Such divisions are not readily apparent in the Pictish period, although there may have been social distinctions between occupants of brochs and wheelhouses during the Middle Iron Age (Parker Pearson and Sharples 1999: 366; fig. 1.6).

1.3 The Viking Age and the Late Norse period in the Western Isles

The only recent excavations of Viking Age/Late Norse settlements elsewhere in the Western Isles are those of the extensive settlement on the Udal, North Uist (Crawford 1986; Selkirk 1996) and, to a more limited extent, at Barabhas (Barvas), Lewis (Armit 1996: 192–3; Cowie and MacLeod Rivett 2015) (Figure 1.8). Cemeteries or single burials have been excavated at Cnip and Bhaltos on Lewis (Welander *et al*. 1987; Cowie *et al*. 1994; Dunwell *et al*. 1995; Armit 1996: 195–202; Armit 2006), whilst burials are also known from Barra (Grieg 1940). There are three chance finds of silver ring-money in Lewis and gold finger-rings in North Uist (Graham-Campbell 1976; Armit 1996: 194–5) along with the famous chessmen from Uig sands (Taylor 1978: Stratford 1997). Recent survey of the Bhaltos area of Lewis has revealed a scatter of Viking Age/Late Norse settlement mounds (Armit 1994).

Since the 1960s, Iain Crawford's evidence from and interpretations of his long-term excavations at the Udal have dominated discussion of the Viking Age in the Western Isles. The Udal complex of three settlement mounds lies at the northern end of North Uist and the stratigraphic sequence within these mounds is considered

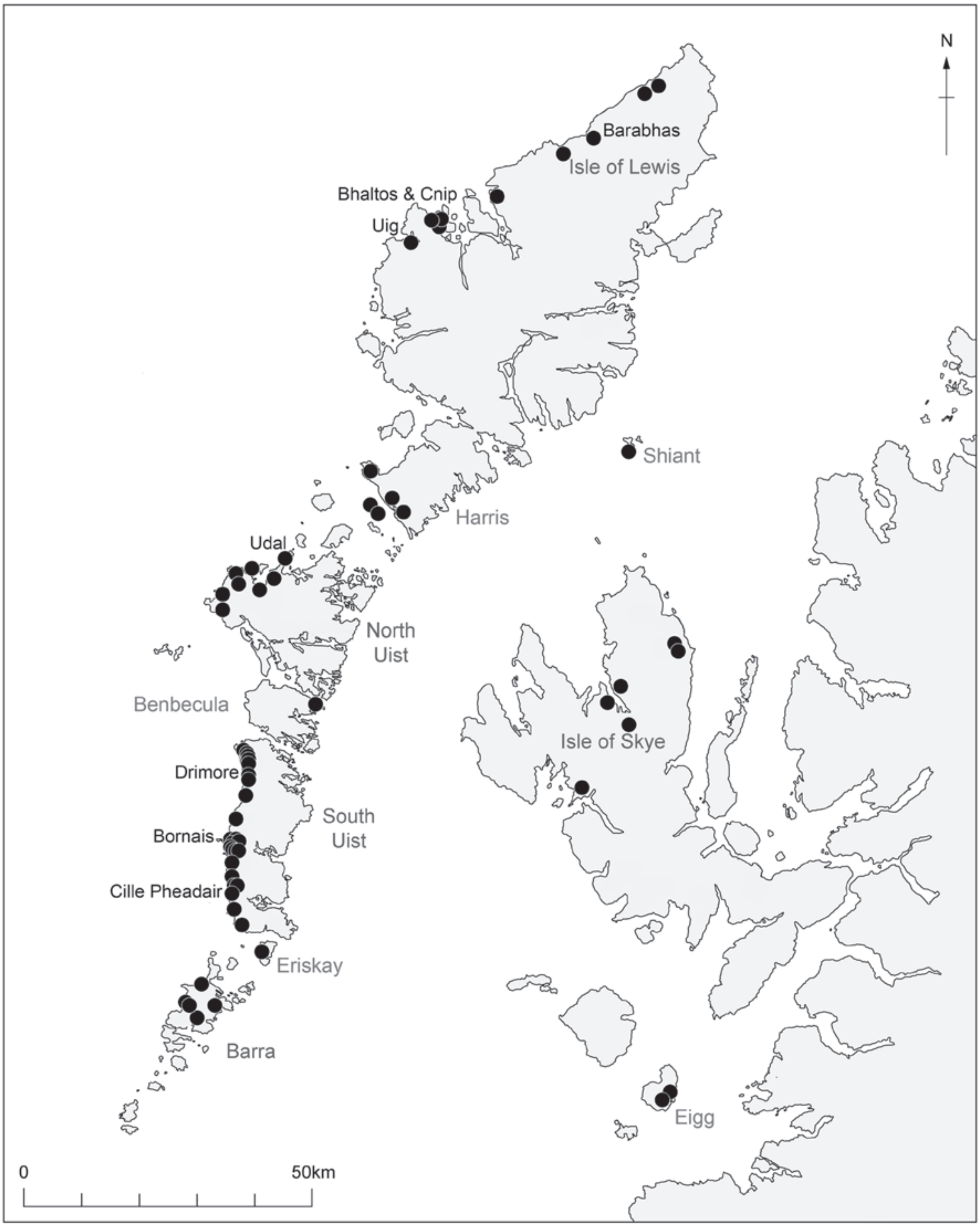


Figure 1.8. Viking Age and Late Norse sites in Skye and the Western Isles

to span the period from the Neolithic to the end of the seventeenth century (Crawford 1974a and b; 1978; 1981; 1986; Crawford and Switsur 1977; Selkirk 1996). The later part of the sequence, dating from the first millennium BC onwards, was excavated in the upper layers of the south mound (Mound 2) and through the entire depth of the north mound (Mound 1). Crawford has argued that the Udal was a politically and strategically important settlement on the boundary between the Uists and Lewis and Harris to the north, a *baile* that divided the Clandonald from the Clanmacleod in the medieval and later periods.

The Viking Age deposits at the Udal (levels X–IX) were a metre deep, sealed by 2m of medieval layers (level VIII upwards), and lying above a sequence of Pictish layers (levels XIV–XI). Levels XIV–XI were characterized by curvilinear 'jellybaby' or 'ventral' houses (similar to those excavated at Bostadh beach in Lewis; Neighbour and Burgess 1996) and by the use of Plain Style pottery (Lane 1990: 120, ill. 7.3). In level X, three of these ventral houses were built over by rectangular houses. Turf construction and corn-drying kilns also appeared in this level, along with a small sub-rectangular fort. As well as these architectural changes, other forms of

material culture appeared: clay platters and small rounded cooking pots replaced the large Plain Style bucket-shaped pots, together with new forms of bonework, bronzework and ironwork (Crawford 1981: 266–7). Apart from one or two objects, though, none of the material could have been diagnosed in isolation as Norse (Crawford 1974: 12). Level X was succeeded by levels IXc, IXb and IX.

Iain Crawford interpreted this dramatic transformation of architecture and material culture as an invasion by Vikings, leading to ethnic replacement. The continuation of potting – rare within the Viking world – was understood as evidence for the persistence of some elements of the previous population, the women and children who were enslaved or 'helotized' by their new masters (Crawford 1974: 12; pers. comm.). Crawford also noticed an absence of inter-occupation deposits generally across the site and also between the floors of the three 'jellybaby' houses that were built over (1981: 266). In one of these instances, a stone-walled longhouse (level X) was built transversely across a curvilinear house (level XI), incorporating part of its east long wall into the east end wall of the longhouse (Crawford 1974: fig. 3). Subsequently, part of the north wall of the longhouse (level X) was incorporated into part of the wall of a later longhouse (level IX).

Dating evidence for these levels was obtained from coins and other diagnostic metalwork, together with five radiocarbon dates from levels XII–IXc. The two dates from pre-Norse levels XII and XI can be calibrated at 2 sigma to cal AD 430–940 and cal AD 560–1000 whilst that from level X calibrates to cal AD 880–1020 and those from level IXc to cal AD 780–1390 and cal AD 1040–1260 (Lane 1990: ill. 7.4). Typologically derived dates from artefacts can also be used to date the levels:

- a gilt bronze pinhead in level XI (*c*. AD 800);
- a bronze strap-end (*c*. AD 900) and an antler comb-case (tenth/eleventh century AD) in level X;
- a silver penny (AD 1055–1065) and a bronze stick-pin (eleventh/twelfth century AD) in level IXc.

On the basis of this evidence, Crawford has argued for a transition from levels XI to X probably in the middle of the ninth century AD. Precise dating to within a century, or even two, is problematic, however, given wide radiocarbon probability ranges and the unknown length of time over which personal dress items and coins might have been curated or kept in circulation in this part of the world.

Despite its lack of any publication beyond a series of interim reports,[9] the Udal project prompted some important research questions that any excavation of Viking Age/Late Norse settlement in the Western Isles needs to address. Beyond the question of chronology and the need to increase the hitherto poor representativity of settlements and houses, the results and interpretations deriving from the Udal excavations have helped to direct subsequent investigations towards the problematic issues of ethnicity and interaction, continuity and transformation, and territory and settlement hierarchy. These and other concerns played a part in our formulation of the Cille Pheadair project's research design.

1.4 The project's research design

In 1995 a research proposal was drafted for work commencing in June 1996 (Parker Pearson and Sharples 1995b). It outlined five research objectives:

1. *The Viking Age and Late Norse house in Scotland.* Such structures are rare and, prior to the Bornais excavations (begun in 1994), had been recovered at only two sites in the Western Isles: Drimore (MacLaren 1974) and the Udal (Crawford 1986). The Cille Pheadair project provided an opportunity to recover an almost complete farm complex, together with its ceramic, bone, stone, and metal artefactual assemblages, carbonized plant remains and faunal remains.
2. *Architectural tradition and history*. Prior to excavation, it was already apparent that the survival of walls at Cille Pheadair was good, as seen in the exposed section of the sand cliff. If, like the Kilpheder wheelhouse, these had been subjected to little or even no robbing then they would enhance our understanding of architectural features. A pertinent research question was the extent to which the distinctive Hebridean 'blackhouses' have their origins in these Norse-period houses.
3. *Group value of settlement clusters.* The Cille Pheadair/Dalabrog (Daliburgh) area is one of two main areas of archaeological importance on the machair within the southern half of the island (the other is Baghasdail). The Norse-period farmstead at Cille Pheadair was situated not far from another Viking Age/Late Norse settlement in Dalabrog (Sites 61 and 207) and an ancient burial ground (Site 62) whose origins might conceivably have been in this period. More significantly, it was in a locality where other sites had already been excavated: the Middle Iron Age Kilpheder wheelhouse (Site 64; Lethbridge 1952) as well as the Late Bronze Age/Early Iron Age settlement at Cladh Hallan (Parker Pearson *et al*. 2004a). It was thus considered useful to focus new excavations on building up a sequence of excavated house plans throughout the Iron Age and into the Norse period within one locality.
4. *Inter-site comparison between a small farmstead and a larger central community.* The small farmstead mound at Cille Pheadair could be compared with the much larger and more numerous Norse-period mounds at Bornais, about 10km to the north. It provided potential for examining variations in subsistence practices, building techniques, spatial organization and structured deposition between these two very different settlements.
5. *Territorial organization in the Viking Age and Late Norse period*. Results of survey in the Dun Vulan environs led to the development of a hypothesis that many of the modern townships as recorded by William Bald in 1805 had their origins in Middle Iron Age and Norse-period settlement clusters on the machair.[10]

The pattern in the Cille Pheadair area was thought to be somewhat different since settlements appear not to be so clustered here (although today's known distribution may

only be partial since some sites have been lost to coastal erosion; Sites 81 and 88 adjacent to the Norse-period farmstead have been washed away, for example). The excavation was intended to ascertain whether Cille Pheadair was a standard farm or buildings for specialized activities such as a fishing station or fish/crop processing area.

In 1997 and 1998 the research objectives were further refined into two schemes (Parker Pearson and Sharples 1996; Parker Pearson and Smith 1997). The first addressed those criteria used to determine a site's importance. The second identified the research themes and questions pertinent to local, regional and period-specific concerns.

Criteria of importance

Rarity (The 1997 and 1998 research designs restated the first of the 1995 objectives.)

Period

The whole of South Uist's west coast machair had now been surveyed, revealing over 200 sites that are identified as mostly settlements between the Early Bronze Age and medieval period (Parker Pearson 2012c). Twenty-four of these have been positively identified as Viking Age/Late Norse, whilst four others are suspected to have been occupied in this period. Thus we could now relate Cille Pheadair to a wider landscape of contemporary settlements from a period that had been largely under-represented in Scottish archaeology.

Condition

The quality of surviving structures, as revealed during the first season of excavation in 1995, was good; walls of stone and turf stood in places to about 0.7m high. As with the nearby Kilpheder wheelhouse, there seems to have been very little stone robbing but some wall collapse. This good survival enhanced the potential to understand architectural features.

Group value: contemporary sites

The South Uist Machair Management Survey (Parker Pearson 1995; 1996b; 2012c) identified three areas of archaeological importance within South Uist's machair. One of these is the Cille Pheadair/Cladh Hallan area where many prehistoric/early historic sites have been located in an area of 3sq km. These include the nearby Middle Iron Age wheelhouse (Lethbridge 1952; Site 64), the ancient burial site (Site 62) that may contain pagan Viking burials, and the Daliburgh Cowshed Viking Age/Late Norse site (Site 61). The Norse-period farmstead site thus possessed high 'group value'.

Group value: chronological sequence

The Cille Pheadair settlement provided the third example in a sequence of excavated house plans throughout the Iron Age in one limited area. The other two are the Cladh Hallan Late Bronze Age/Early Iron Age houses (Parker Pearson *et al.* 2004a: 59–87; forthcoming) and the Kilpheder Middle Iron Age wheelhouse (Lethbridge 1952).

Diversity

The farmstead settlement consisted of a wide range of house types and features, notably longhouses, outhouses, huts and middens. We recovered full plans of buildings that provided a chronological sequence of diverse building types of alternate orientations (either N–S or E–W) and shapes (bow-walled and straight-walled). In addition, this settlement provided interesting contrasts with the Norse-period community at Bornais, about 10km to the north.

Survival

Although some erosion had taken place before excavation began in 1996, our excavations indicated that Cille Pheadair's sequence of buildings was substantially complete; only the very ends of some of the buildings had at that point been lost. Adjacent sites (Sites 81 and 88) had, however, probably been entirely destroyed by coastal erosion. Though undated, these lost sites might have constituted two other nuclei of a larger, if dispersed, Norse-period settlement, destroyed prior to 1996.

Research potential

Architectural change, cosmology and blackhouse origins

We hoped to clarify methods of wall and roof construction, whether part of the house was used as a byre, and how the interior was sub-divided for different activities such as cooking and sleeping. As well as embodying more pragmatic functions, the Hebridean Norse-period longhouse probably had important cosmological associations, notably as a metaphor of the human body, and as a model for the supernatural cosmos (Doxtater 1990; Gurevitch 1969). A particularly pertinent research question is the origin of the blackhouse. In contrast to Lethbridge's Celtic-origin hypothesis (1948: 81) and Iain Crawford's dismissal of continuity from Norse origins (1974: 1), our results show certain strong similarities in house plan between the Cille Pheadair longhouses and the South Uist blackhouses inhabited before 1850 (Kissling 1944).

Township origins

The hypothesis formulated for the long-term settlement patterns of South Uist is that most of the townships can trace their origins back 2,000 years, with each having Middle Iron Age and Viking/Late Norse precursors on the machair prior to an island-wide shift to the edge of the peatlands in the medieval period (see 'Territorial organization', above; Parker Pearson 1996c; 2012c). The situation in Cille Pheadair is slightly different from the normal pattern. By 1997–1998, the developing hypothesis was that whilst the likely location of the medieval–post-medieval settlement can be located, there are probably four settlement nuclei of Middle Iron Age date in the vicinity according to recent surveys (Parker Pearson 2012c). This large number is in contrast to most other areas and represents a significant variant from the main pattern; this unusual concentration of Middle Iron Age settlements may be due to the proximity of a Late Bronze Age/Early

Iron Age settlement nucleus at Cladh Hallan, from which the dispersed Iron Age pattern developed.

Vikings or Hebrideans?

As at Bornais, the revetted stone buildings excavated at Cille Pheadair indicate continuity in local building traditions after the Viking colonization of the islands, although the shape and layout of houses and other structures changed significantly. We suspected that this was indicative of indigenous populations adopting Scandinavian styles and material culture, in contrast to Iain Crawford's notion of invasion and population replacement (Crawford 1981).

Trade and interaction

The sagas record considerable Hebridean involvement in the Viking world (Anderson 1922; Crawford this volume), corroborated by imported artefacts found during the excavations at Cille Pheadair and Bornais (for which see Sharples 1996; 1997; 1999; 2000b; 2003; 2004; 2005d; 2012b). The project sought to clarify whether the Uists were part of one of the four twelfth-century sub-kingdoms of the Lordship of the Isles, by establishing whether Cille Pheadair provided evidence of connections to places such as Man, Ireland, the Northern Isles and elsewhere.

Power and status

The Drimore house (MacLaren 1974) was bigger (at 14m × 5m) than any of the buildings found at Cille Pheadair but smaller than the largest house at Bornais. This distinction, along with the quantities of steatite artefacts from Drimore, raised questions about social status differences between settlements. These differences may also relate to other factors such as settlement form; Drimore and Cille Pheadair appear to have been isolated farmsteads whereas Bornais was a larger complex.

1.5 The excavation 1996–1998

The excavation of Cille Pheadair raised a number of technical and heritage management issues. The 1m-thick layer of archaeological deposits was deeply buried beneath 2m–3m of sterile windblown sand that needed to be entirely removed but in such a way that the resulting spoil would not be blown across the neighbouring fields (Figure 1.9). The depth of deposits also raised problems, not simply in the need to batter sections at a suitable angle to make the excavation trench safe but also in preventing the fresh exposure of new sand cliff faces that might rapidly have developed into deep blow-outs, in the face of prevailing (and often fierce) onshore westerlies.

The top layers of sterile sand were removed using a tracked 360° earthmoving machine, loaded into a lorry and tipped over the sand cliff about 100m north of the site (Figure 1.10). This large heap of unstable sand was covered with fishing nets, and a post fence with a plastic windbreak was constructed along the top of the cliff to prevent the loose sand from blowing in onto the fields. The site itself also required fencing in order to keep out

Figure 1.9. The Cille Pheadair site under excavation, seen from the air from the northwest

Figure 1.10. The Cille Pheadair site under excavation in 1996, seen from the south

Figure 1.11. Consolidation of the excavation's baulks by re-laying turf, seen from the east

Figure 1.12. Plan of the excavated area and the long section (both marked by dot-dash). The extrapolated walls of the sandbank enclosure are marked with dashed lines

cattle grazing on the machair in the winter months. Once the batter had been created on the site's east, north and south sides (the west side being open towards the sea), we covered these sloping areas in turf so that there would be no exposed sand surfaces around the sides of the excavation area (Figure 1.11).

The difficulties of working on Uist machair sites, even in summer, have been detailed by Iain Crawford (1974; 1978) who emphasized the need for considerable prior experience of digging in this wet and windy environment and recommended the selection of hardy mesomorphs as the physical type of person who made the best digger in these often rough conditions. We had already undertaken excavation of an exposed west coast location on the promontory at Dun Vulan but, even so, at Cille Pheadair we were troubled by a new experience, stinging sand blowing in from the beach; when the west wind was at its strongest the excavation team had to wear goggles and also had to shovel out the newly windblown sand that settled and drifted with alarming speed.

In 1997, during our second season, the grimness of the team's working conditions was exacerbated by the arrival of a dead and rotting dolphin at the high water mark immediately next to the site; bizarrely it was joined a week later by a rotting sheep carcass. Despite Crawford's warnings to the contrary (1978), we had no insuperable difficulties in digging vertical sections in the sand, and our techniques of excavation and recording were much the same as those used anywhere else in Britain.

The uppermost houses on the site (phases 6–9) were excavated by quadrants in order to establish long sections and cross-sections through them without the need for baulks, opposing quadrants being dug simultaneously to the top of the floor of the house. Each floor was then sampled in its entirety in 0.5m x 0.5m squares (with samples for magnetic susceptibility and phosphorous taken at 0.5m intervals across each floor), with the section lines being maintained across the floor (often a tricky operation when the orientation of the house did not coincide with the site grid on which the sampling was done). Nearer the bottom of the sequence, the floors of stone-built longhouses recorded as Houses 700 and 500 were excavated in plan, without long sections. This enabled floor sampling to be carried out more rapidly and effectively.

In addition to the house floor samples, samples for flotation (normally *c*. 30 litres or more) and for magnetic susceptibility and phosphorous were taken from every excavated deposit except for layers of clean windblown sand. All deposits were dry-sieved on site through a 10mm mesh, other than entirely sterile windblown sand layers and those contexts from which a full spread of samples was taken for environmental and other scientific analysis.

One of the difficulties confronting the project was that there was no easy way of determining the extent of the site, a settlement mound entirely buried under the coastal dune. Its north–south dimensions could be estimated according to the length of deposits exposed in the sand cliff but there was no means of evaluating the site's width east–west. The depth of the dune on top of the site ruled out the possibility of using conventional geophysics. We were also concerned about taking away too much of Alasdair MacIntyre's croft were we to open a very large

trench. We settled for a trench whose top measured about 15m east–west by about 25m north–south, with battered sides that created an area available for excavation at the bottom of the trench of 9m–10.6m east–west by 18m–21m north–south. The trench was thus slightly trapezoidal in plan, with its longest edge towards the sea (Figure 1.12).

In the course of excavation, we realized that this trench gave us the opportunity to excavate all of the structures but there was little opportunity to excavate much of the midden layers, especially the later ones, that extended to the north, south and east sides of the buildings and ran under the surrounding dune. This was considered to be a good compromise: our prime research focus was on the buildings themselves and on their stratigraphic sequence.

We estimated that the sea, perhaps as far as a kilometre distant from this site in the Norse period, had probably washed away the 1m–2m width of the west wall of a sandbank enclosure (which surrounded the site in its earlier phases; Figure 1.12) and 4m–5m of midden layers that had originally been deposited by the tipping of material over the sandbank's west wall (towards the sea). Parts of the west walls of three houses belonging to different phases of the site's occupation (recorded as Houses 700, 500 and 312; see below) had also been washed away.

In retrospect, this was a fortuitously well-timed rescue excavation: had our intervention been any later, then the west walls of all but one of the principal houses would have been entirely destroyed without record. We were fortunate enough to be able to recover almost the entire extents of all the house floors, one of the principal objectives of the project.

One of the benefits of excavating Cille Pheadair, in contrast to most of the settlement mounds on the machair, was that it had been covered so deeply by sand. This meant that the archaeological deposits had been safe from damage by burrowing rabbits and free of contamination and mixing of deposits within their burrows (although a single burrow was detected in the northern part of the cliff section). This is in strong contrast to the situation at Bornais, where Sharples discovered major rabbit damage in all three mounds. The advantage of excavating a single-period (although multi-phased) site sandwiched between two layers of deep and sterile sand was that there was no danger of contamination by or residuality of earlier or later material.

The excavation began in early June 1996 with two supervisors – Mark Brennand and James Ward – working under my direction. As a University of Sheffield undergraduate, Mark had previously worked for a season on Dun Vulan in 1993 and was well acquainted with the particularities of excavating these kinds of deposits. He was sole supervisor in 1997 and 1998; by the end of the excavation he had taken over most of the directing, to leave me free to spend more time on the excavations running in parallel at Cladh Hallan. Much of the success of the field seasons is due to Mark's skill in excavation, his meticulous recording and his talent for site management. In very trying conditions he not only had extremely complex stratigraphy to interpret but also shouldered the far from easy task of motivating and training the undergraduate excavation teams, made up of students from the universities of Sheffield, Cardiff, Bournemouth and Southampton.

After we completed the first month's work in June–July 1996, we realized that we had underestimated both the complexity of the site and the length of time required to dig the area that we had stripped. As a result, the 1997 and 1998 seasons were longer in duration, lasting for two months in each year. In all years the weather conditions were extremely variable, being often very wet and windy but occasionally hot and sunny.

The deposits and stratigraphy at Cille Pheadair were much more complicated than those which we had previously encountered at Dun Vulan, where there were no cut features other than for the stone walls of some of the buildings. At Cille Pheadair we had to deal with a myriad of scarcely visible cuts, pits and postholes as well as the accumulated deposits forming the settlement mounds that are so characteristic of archaeology on the machair. Secondly, the very first house that we encountered – House 007, belonging to the final phases of the site's use – had been re-occupied and rebuilt inside with some very complex cellular structures. We also experienced difficulties while learning to identify the exceptionally ephemeral floors of House 007 and its outhouse (006). This was also our first encounter with decayed turf walls, initially discovered within that house but later seen as above-ground walling for an earlier house (House 500). Excavation is always a process of interpretation and proceeds on a trial-and-error basis (for example, is this layer on top of that layer? Is this wall a house wall? Is this dark organic layer a house floor?).

A number of the hypotheses, speculations and assertions recorded in the three interim reports (Parker Pearson *et al*. 1996a; Brennand *et al*. 1997; 1998) have been disproven as a result of subsequent excavation or post-excavation analysis. No archaeological excavator gets everything right all the time, especially not on stratigraphically complex sites. The important point is that the best excavators learn to identify their errors as they go along, individually and collectively, as an excavation team and as a post-excavation team. Experience and skills of observation are both critical requirements; we move on as we construct for ourselves a mental picture of the complex ways in which deposits were formed and accumulated.

This understanding of a site can arise not just from the gradual accumulation of knowledge and material but also from dramatic moments of discovery, revelation and new awareness as hitherto irrelevant or unconnected elements are made sense of, or imperfect and flawed models of site formation are replaced by new ones that better fit the new observations. Out of this process comes understanding of the sequences and events that brought those remains into existence.

As experience grows, the exciting discoveries are not the artefacts or precious finds but those concerning contextual relationships, that enable us to find a way through the three-dimensional puzzle that is the site, and to predict those relationships increasingly successfully,

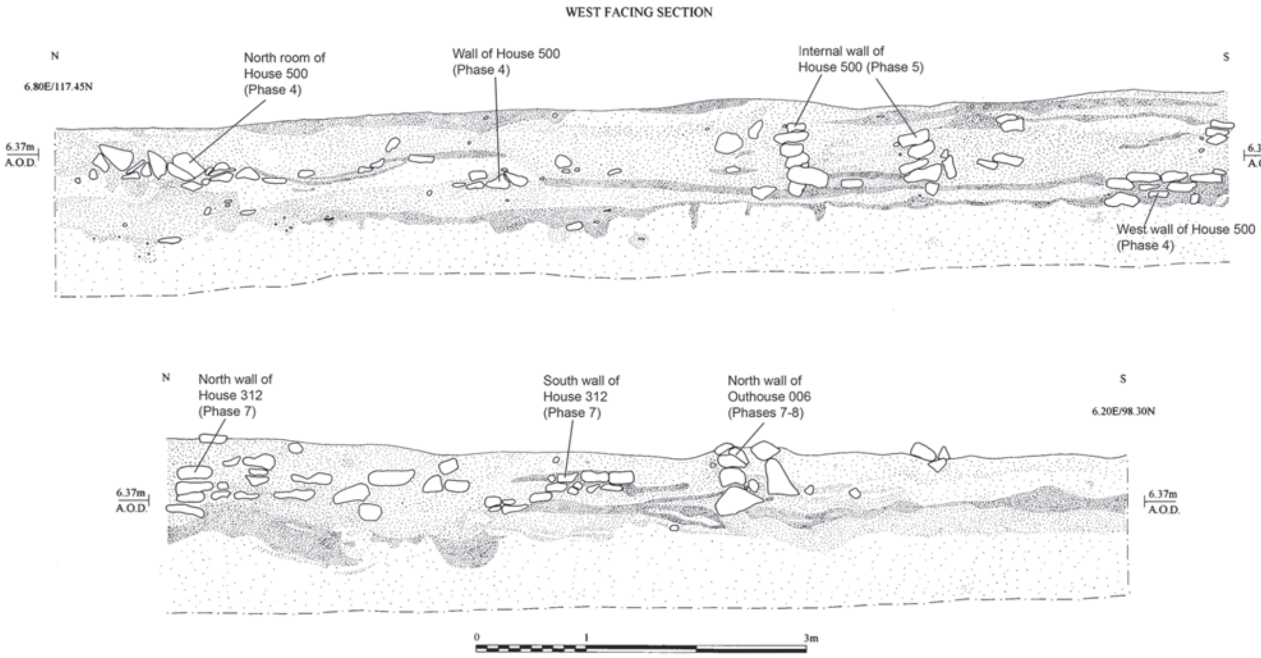


Figure 1.13. The long section, north–south, along the sand cliff before excavation, with stonework of major structures

thereby building a successful strategy by which a site is unpicked and understood both in its minutiae and in its entirety. Some understandings will always be unresolved or partial whereas others will be more definitive; reports of archaeological excavations should always attempt to cover these aspects of our understanding of context.

Perhaps the greatest archaeological significance of houses within these prehistoric and ancient settlement mounds on South Uist's machair is that their floors as well as their walls are preserved. The reason for this is that such buildings on the machair were generally constructed by sinking them into the ground – these were genuine sunken-floored buildings in which the occupation floor layer was not only below ground level but also laid directly on the soil below (and not perched above it on a raised wooden floor as seems to have been the case with pagan Anglo-Saxon sunken-floored buildings elsewhere in Britain).

At Dun Vulan we had developed an integrated environmental and scientific approach that allowed us to investigate these kinds of house floors in considerable detail, gridding them at half metre intervals for geochemical and geophysical sampling and for intensive flotation of the entire floor (Parker Pearson and Sharples 1999; Smith *et al*. 2001). All of the floors thus analysed at Dun Vulan had been small or partial, and Cille Pheadair was the first opportunity, together with Sharples' excavations on the Bornais mounds, to adopt this integrated approach to whole floors within substantial buildings; this sampling method was also used on the multiple floors of the Late Bronze Age/Early Iron Age roundhouses at Cladh Hallan, an excavation that was underway in the same years that Cille Pheadair and Bornais were excavated (see Chapter 5 for methodology).

In the first excavation season at Cille Pheadair (June 1996), the site was stripped and cleaned to reveal the outline of a sunken-floored longhouse (House 007) in the centre of the site, oriented north–south (*i.e.* with its short, gable-end walls at the north and south), and a small structure (Outhouse 006) in the southwest corner. There was no sign of any above-ground wall remains for either of these structures nor any surviving ground surface except for a shallow hollow outside House 007's west doorway. This suggested that there had been a period of time, perhaps lengthy, during which the bare, exposed surface was scoured by wind erosion before it became covered with the eastward-moving coastal dune that subsequently covered the settlement with such a depth of sand. The long section along the eroding sand cliff was also cleaned and recorded (Figure 1.13).

In that 1996 season, Mark Brennand supervised the excavation of the two houses whilst James Ward supervised a 4.5m × 5m trapezoid-shaped trench through midden layers discovered in the northeast corner of the site. A number of cellular structures (Huts 031 and 086/024) within House 007 proved extremely time-consuming to record and excavate, and it was only at the end of a month of excavation that House 007 and Outhouse 006 were fully recorded. In excavating the floor of 007 in its southeast quadrant, we discovered that the foundation of the wall here was considerably deeper than the level of the floor: this section of 007's wall was originally the east (gable-end) wall of an earlier house (House 312).

We were able to make a start on the excavation of east–west oriented House 312, lying with its east end beneath House 007, by removing the windblown sand from above its floor in its western half. Progress was faster within the subsidiary trench into the midden; here we located the northern part of the east wall of the sandbank enclosure from which the farmstead began.[11]

In the second season (June–July 1997), we intended to complete our excavations but were still not prepared for the complexity of deposits and structures. We removed the walls of House 007 and excavated its east doorway (blocked during later reuse) and entrance passage, machining out an additional area of windblown sand above the deposits on the central east side of the original excavation trench until we could identify the end of the entrance passage and the steep dip of the midden deposits as they fell away on this eastern edge of the former settlement mound.

We completed the excavation of House 312 and of two cellular structures (Shed 400 and Shed 406[12]) that had been cut through by House 312's north wall. With the removal of these, we uncovered the grandest building of the whole sequence, House 500. This was a 14m-long longhouse, oriented north–south (*i.e.* with its shorter, gable-end walls at the north and south). It had a doorway in the south end of the long east wall and a separate square room at its north end.[13] The longhouse was subsequently modified so that the north room became an outhouse and the main living area was narrowed and shortened.[14] During this phase of re-use, the house's doorway was relocated to the north end of its long east wall.

During the 1997 excavation season, we reached the lower floors of House 500 but were unable to excavate them owing to lack of time. On the outside of the revetted sandbank (now finally recognized as such), we found a midden-retaining wall (433). Underneath House 500, within an exploratory trench, we located a pit cut into sterile sand whose fill contained a copper-alloy pin, a comb and other artefacts, hinting at a rich assemblage of finds within other similar features at the bottom of the sequence. Within the sides of a pit in the floor of House 500 we also found what appeared to be two postholes, hinting at the possibility of an earliest phase consisting of a wooden building.

We were fortunate enough to receive funding from Historic Scotland for a third season's fieldwork in June–July 1998. In those two months we completed excavation of House 500 and its impressive entrance passage and forecourt. We also excavated a smaller house beneath it (House 700), and completed excavation of the midden layers on the east side of the site as well as midden deposits and other layers at the north end of the site. The only area that remained substantially unexcavated within the trench was the south end, below the small outhouse (Outhouse 006), an area of the settlement consisting of midden deposits tipped over and outside the south wall of the sandbank enclosure that surrounded the farmstead. During 1997 and 1998 this area against the sloping southern end of the excavation was grassed-over (long in advance of the backfilling and returfing of the rest of the excavated area); the grassy platform created by the returfing of this southern end of the trench was used as an outdoor site office.

Few excavations end at a leisurely pace and the last days at Cille Pheadair in July 1998 were particularly nerve-racking. Not only did we need to finish excavating the floor of the earliest stone-built house – House 700 – but we had discovered a dense mass of postholes, pits and other deposits beneath it. Most of these features were easy to locate and excavate, their dark fill being highlighted against the brilliant white of the underlying sterile windblown sand. But some pits had been backfilled in antiquity with sand identical in colour and texture to that which had been dug out – the only detectable difference on their surfaces was that the scrape of a trowel on the consolidated sterile sand gave off a faint ringing sound whilst on the flour-like fill it was silent. As one team dug out and recorded these features, another was seeking out any available source of turf to cover the excavated area, with the aim of consolidating it for the foreseeable future and preventing it from developing into a sand blow-out.

In 2003, I returned with Kate MacDonald (then a research student at Sheffield University) to investigate the northern sandbank wall that was visible in the cliff-edge section. The 1998 excavation had never resolved the question of whether the postholes of the timber building at the bottom of the sequence had continued northwards and, if so, whether they pre-dated the sandbank enclosure. By cutting a step into the sand cliff, at the point where one of the lines of postholes would hypothetically have intersected with the sandbank enclosure, we were able to confirm that the postholes had not continued beyond the 1998 excavation limits.

Today the site has been almost entirely washed away, with most of it destroyed during the storms of 2003 and 2005. For the first few years after the completion of the excavation, the turfed-over foundations of House 700 could still be seen but now, like Sites 81 and 88, there is no physical trace of its presence.

1.6 This report

The preceding section has given a brief history of the excavations at Cille Pheadair; the remainder of this volume, however, works from past to present, giving a 'historical' perspective on the development of the Cille Pheadair farmstead, century after century, until its final abandonment. We were lucky in finding a complex, 1m-deep stratigraphic sequence in which many of the deposits and structures can be clearly linked stratigraphically. This has allowed us to place individual contexts into stratigraphic phases across the site that relate to major constructional episodes and their subsequent periods of use. Consequently, this enables us to construct a simple and clear sequence and narrative.

Before discussing the Norse farmstead itself, this volume commences with a report on a Pictish cairn (cal AD 640–780), found by chance in June 1998 by Mark Brennand to the south of the Norse-period settlement. Walking along the beach one afternoon,[15] he noticed three aligned stones within the beach shingle, which turned out to be one edge of a square cairn. The exposure of the cairn within the bank of beach cobbles was due to the action of the sea; the cairn was therefore at risk of

erosion and so, with Historic Scotland's permission, it was excavated immediately. This excavation, and the discovery within the cairn of the skeleton of an adult woman, generated more local interest than any other aspect of the archaeological investigations in the 1990s. The Pictish woman buried within the cairn was given the name of Cille Pheadair Cait (Kilpheder Kate) by the local community.

Chapter 3 discusses the evidence of ploughing (phase 1; preceding the establishment of the Norse farmstead), the sandbanked enclosure that was constructed prior to the building of the first stone-walled house and the many pits inside it (phase 1). Chapter 4 describes layers and features within and outside the sandbanked enclosure (all phase 2). Chapter 5 covers the construction and use of the first stone-walled house – House 700 (phase 3). Chapter 6 is concerned with the large stone-walled house – House 500 – that was constructed above the ruins of House 700, partially incorporating some of its walls in the new build (phase 4). This process of levelling-up to cover (and thereby preserve) the previous house floor whilst at the same time reusing a part of the existing *in situ* walling is a consistent feature of each longhouse's build.

In Chapter 7, the modification of House 500 is documented, as the main living area was turned into a smaller building (phase 5). Chapter 8 details the 'sheds', curious cell-like buildings (phase 6) that were built between the abandonment of House 500 and the construction of a new longhouse (House 312). Chapter 9 covers the construction of House 312, laid out on a different (east–west) axis to the earlier longhouses (phase 7). Chapter 10 is the description of House 007 (phase 8), a north–south longhouse built on top of the east end of House 312. Chapter 11 covers the re-use of the abandoned House 007 and the various constructions within its ruins (phase 9).

Chapters 12 to 23 are concerned with the assemblages of artefacts, faunal and plant remains, and with various analytical approaches. Whilst methodologies and overall results are presented fully in this section of the book, we have attempted to integrate results into the earlier chapters covering each phase so that the reader may gain a better contextual understanding of the site and its structural phases. Chapter 24 discusses the radiocarbon dating and Chapter 25 places Cille Pheadair in its context.

For a full understanding of local context, this volume should be read in conjunction with the monographs on the site at Bornais excavated by Niall Sharples (Sharples 2005d; 2012b; forthcoming). In contrast to the simple farmstead at Cille Pheadair, Bornais appears to have been a centre of local power, and questions of, for example, status, economic differences, and political and economic control can be addressed through comparison of the architecture recorded at the two sites, and comparison of the various assemblages. A detailed comparison of such things as the artefact assemblage has not been attempted in this volume, since it would involve excessive repetition of information available in the Bornais monographs: the monographs on the two sites should be used together to obtain a full picture of the differences and similarities between the small farmstead at Cille Pheadair and the major centre at Bornais.

Notes

1 Gaelicized place-names are used throughout except where a site is well-known in the literature in an Anglicized form. See Sharples 2012b: xvii–xviii or Parker Pearson 2012b: 426–8 for a glossary of English–Gaelic place-names.

2 All site numbers derive from the machair survey; see Parker Pearson 1995; 1996b; 2012c.

3 For more on Lethbridge, see Sharples 2012b: 11, 36.

4 Certain zones of the machair, notably the Dun Vulan environs and the Iochdar area, are unaffected by dune formation other than by encroachment of the frontal dune. Others, such as the Dalabrog and north Cille Pheadair areas, are covered in large and undulating dunes that have probably inhibited the survey's effectiveness.

5 For an overview of machair formation, see Parker Pearson 2012c: 17–19 and Sharples 2012a: 1.

6 Site 88 (see below) is often confused with Site 66, the Cille Pheadair Norse-period farmstead reported in this volume.

7 A core taken from the area of the drained loch by the late John Evans of Cardiff University produced a basal series of lake sediments containing cockles, overlain by peat that was finally covered with machair sand encroaching eastwards into the loch.

8 But note that excavations at Cille Donnain indicated that the islet on which the Norse-period church is located was *not* previously inhabited (Parker Pearson 2012a).

9 At the time of writing, following the death of the excavator Iain Crawford, Beverley Ballin Smith is working on bringing the Udal to publication.

10 With the exception of the *Gearraidh*– [Garry–] townships, which appear to be territorial sub-divisions of more recent date, containing no machair within their boundaries; for full discussion see Parker Pearson 1996c; 2012c

11 Of course, at the time we were unaware of its significance and therefore tentatively interpreted its outer stone revetment wall as the west wall of a putative longhouse (which is provisionally numbered as House 326/337 in the site records and interim reports).

12 The north wall of Shed 406 was provisionally identified in 1996 as the south wall of a hypothetical House V, and appears as such in the site records and in the interim report for that year (Parker Pearson *et al.* 1996a).

13 This square room at the north end of House 500 was provisionally identified in 1997 as putative Houses Y and Z, and appears as such in the interim report for that year (Brennand *et al.* 1997).

14 House 500's new north wall was provisionally identified in 1997 as belonging to putative Houses X and W, and appears as such in the interim report for that year (Brennand *et al.* 1997).

15 Mark's discovery of the Pictish cairn on his day off resulted from a televised football match; he noticed the cairn while on a long walk home from the Borrodale hotel, trying to shake off the gloom resulting from an abysmal performance by England in the World Cup.

2 The Pictish burial cairn, cal AD 640–780

M. Parker Pearson

with contributions by J. Williams, A. Chamberlain, P. Marshall, J. Montgomery, J. Evans and C. Chenery

2.1 Introduction

M. Parker Pearson

A square cairn was discovered in June 1998 by Mark Brennand, about 70m south of the Norse-period settlement, protruding from the bank of beach cobbles and shingle that runs along the foot of the sand cliff created where the machair abuts the beach (Figure 2.1).[1] It lies in approximately the area of a Viking midden producing shell, bone and nails, recorded by Richard Feacham of RCAHMS in 1951 (Canmore 9790; NF 728 196; Machair Survey Site 81 [Parker Pearson 2012c: 52]) but never relocated; Feacham's site is either the Norse-period farmstead described in this volume (at NF 729 198) or is another Norse-period settlement that disappeared before 1996 as a result of coastal erosion.

On discovery the cairn was visible only as a north–south line of three uprights poking through the shingle. After removal of the shingle, these three visible uprights were revealed to be the south end of the cairn's west wall; its southwestern part could be seen to be partially eroded by the sea. The rest of the cairn, however, was sealed beneath a thin layer of beach sand that lay directly beneath the beach shingle.

A trench *c.* 5m × 5m was dug around the cairn and two smaller trenches were excavated to the south and west to ensure that other burial remains were not located in these areas. A north–south pile of rubble (920) was found to the south but this was considered to be of natural origin. The area north of the cairn was too deeply buried under shingle for any trial trenching and the cairn's east side abutted the 2m-high sand cliff at the top of the beach. The cairn was excavated by hand and the entire grave fill was sampled for flotation to recover all skeletal, artefactual and environmental material.

As mentioned briefly in Chapter 1, the location and condition of the cairn were notified to Historic Scotland immediately on discovery, and it was decided to excavate since sea erosion had already begun to damage the cairn. Although the cairn must have been protected for many centuries by the overlying dune, the protective sand had been washed away by the sea, leading to the structure's exposure and consequent first stages of erosion. The decision to excavate and remove the cairn from the beach has proved correct; the severe storms in 2003 and 2005 caused significant changes to this length of the sand cliff along the machair's coastal edge, and would have entirely destroyed the cairn had it still been *in situ*.

After excavation, the stones of the cairn were taken to Taigh Tasgaidh Chill Donnain (Kildonan Museum), where the cairn was immediately re-erected in the museum grounds (Figure 2.2). The skeleton found within the cairn was initially taken to the University of Sheffield for analysis and subsequently returned to Taigh Tasgaidh Chill Donnain; at the time of writing (2017), the skeleton was part of a touring exhibition curated by the Wellcome Collection and the Museum of London.

2.2 The cairn

M. Parker Pearson

The cairn was composed of a square setting (*c.* 2.5m × 2.5m) of upright stones (900), standing to a height of 0.40m (Figures 2.3–2.4), within which a layer of beach pebbles (901) lay over a layer of waterworn stone slabs (902); these completely covered the slabs (903) that overlay the grave cut (906). The sequence of construction of the kerb of upright stones (900), the upper layer of slabs (902) and the grave-covering slabs (903) could be reconstructed in some detail because of the overlaps between particular stones (Figures 2.5–2.8).

In several cases it could be seen that one stone had to have been laid before another, thus permitting us to reconstruct something of the sequence of stone-laying. Twenty-seven slabs within layer 902 had been laid overlapping other stones, demonstrating stratigraphic relationships between them. By plotting the overlaps within 902, we were able to observe that they lay on top of the stone kerb (900) in three places (Figure 2.5), and that the central slabs were probably

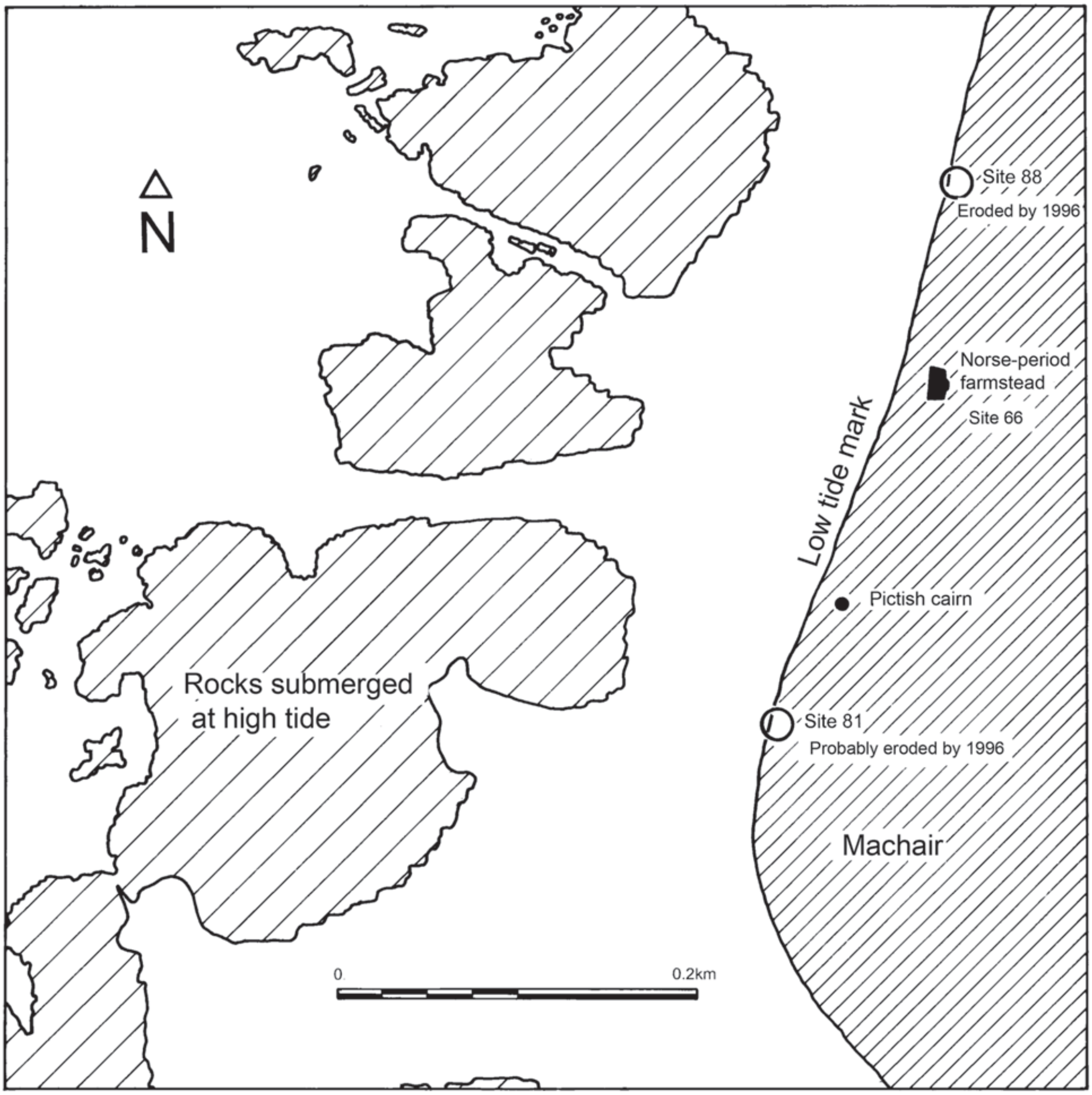


Figure 2.1. The location of the square cairn. Note that this figure shows the coastline in 1996, and major episodes of erosion have changed it since then

the last to be laid. Among the first to be laid were some of those along the west side which were set from south to north. On the eastern side they also appear to have been laid from south to north. The slab layer (902) appears to have been laid first as an outer row of stones all the way round and then infilled progressively to the middle, to the area above the grave itself.

The cairn's square setting (900) was set in a cut (905) but this was difficult to recognize. Only one stone corner post survived (in the south corner) and gaps remained where the other three had presumably been removed (Figure 2.8). These corner stones were probably removed in antiquity, before the site was covered by the encroaching dune, since the north and, to some extent, the west corners were buried under sand and shingle in recent years (*i.e.* before Brennand's discovery in 1998). The 'front' of the cairn is probably its northwestern side because the kerb on this face is constructed with the tallest stones (Figures 2.9–2.10). A *c*. 50mm-thick layer of brown sand in the eastern part of the trench probably marks the line of a buried soil, of which no evidence could be found within the cairn or immediately around it (Figure 2.11).

2.3 The burial

M. Parker Pearson

The grave (906) was lined with stone slabs (907) and roofed with a row of five widely spaced flat slabs (903), none of which were visible until the slabs of layer 902 were removed.

Figure 2.2. The Pictish cairn relocated and reconstructed in the grounds of Taigh Tasgaidh Chill Donnain (Kildonan Museum)

Figure 2.3. Mark Brennand excavating the cairn after clearance of shingle, seen from the northeast

It contained the skeleton of an adult female (908) within a grave fill of clean sand (904) (Figures 2.12–2.13). The grave was most likely dug before the square stone kerb was erected around it. Both were constructed before the stone slabs (902) and the beach pebble layer (901) were laid down. There was no indication of any secondary cut or disturbance through the slab layers (902 and 903) into the grave. The stone cairn and the grave had different orientations, with the axis of the grave on 160° and the east–west axis of the cairn on 135°.

The body of an adult woman had been placed in the grave with her head to the south–southeast and her face towards the west on 281° (Figures 2.14–2.15). Her burial was unaccompanied except for a single unworked cobble (Figures 2.16–2.17) lying above the scattered finger bones of her right hand, in the groin area. Removal of the sternum and disturbance of the right hand, described in the skeletal report below, suggest post-mortem disturbance of the grave but this must have occurred prior to the construction of the cairn (since the overlying slabs [902] and layer of beach pebbles [901] had not been dug through). It is thus most likely that the entire cairn, including its kerb, was constructed not only after the initial burial but also after subsequent disturbance of the corpse.

Whether this latter act of disturbance was a sanctioned

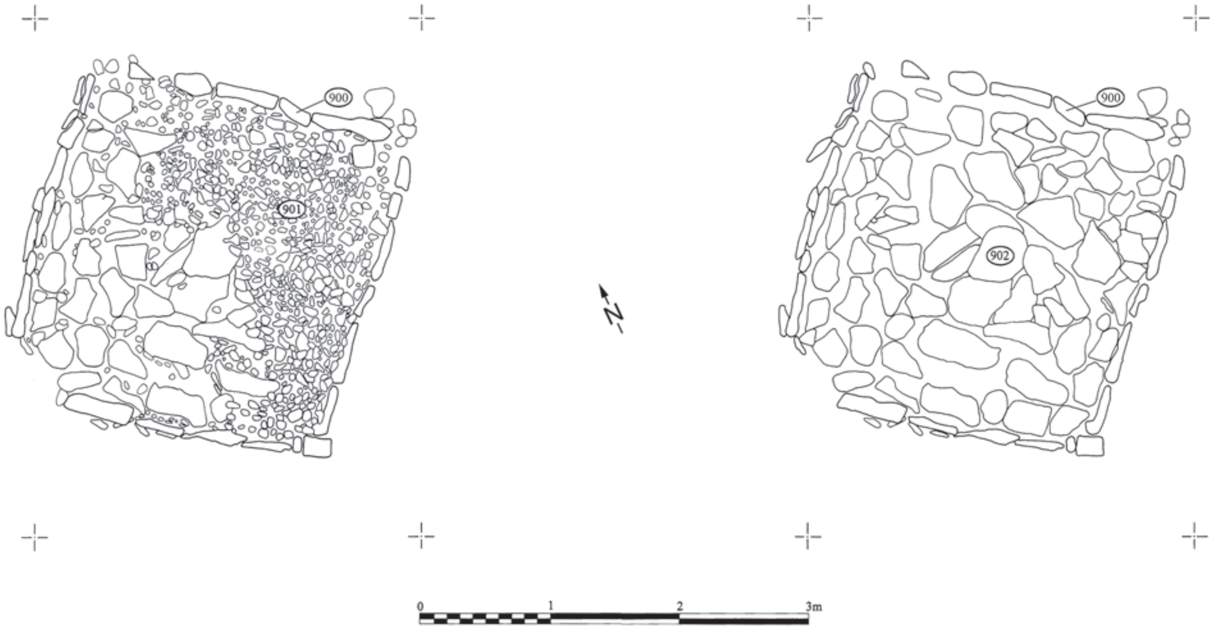


Figure 2.4. Plans of the beach shingle layer (901) over the cairn and waterworn slab layer (902)

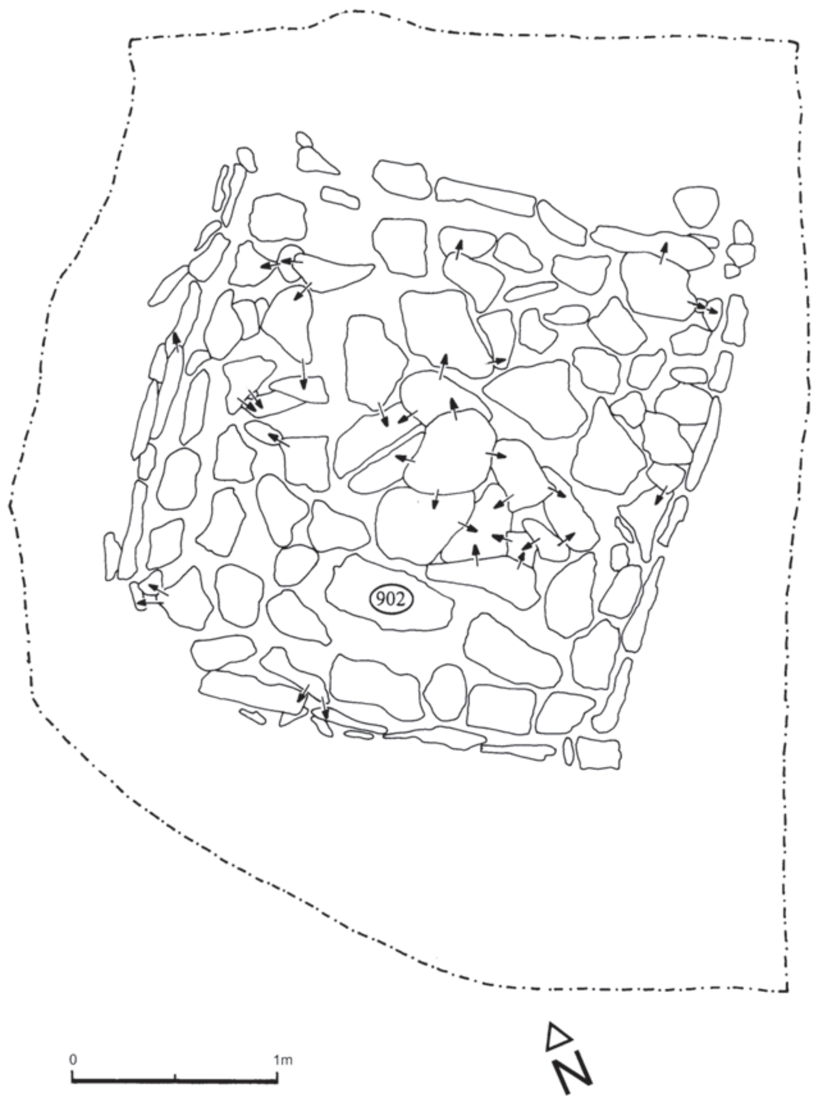


Figure 2.5. Plan of the waterworn slab layer (902), showing overlaps (the arrow points to the lower stone)

Figure 2.6. The waterworn slab layer (902), seen from the southeast

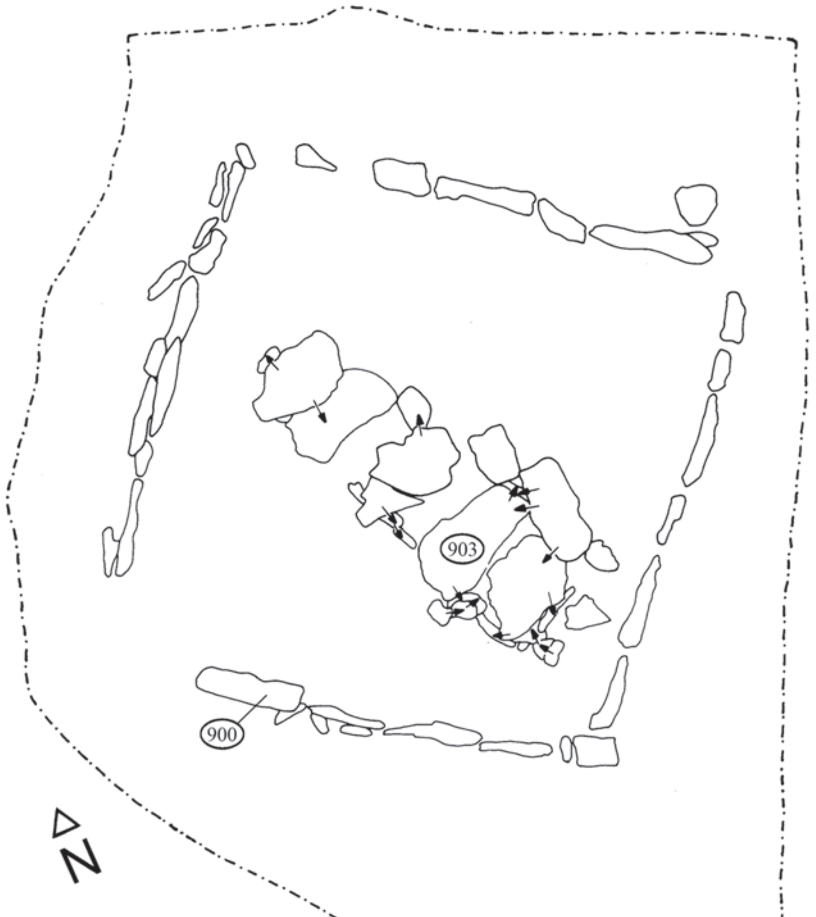


Figure 2.7. Plan of the slabs (903) lying over the grave, showing overlaps (the arrow points to the lower stone)

Figure 2.8. The slabs (903) lying over the grave, seen from the northwest

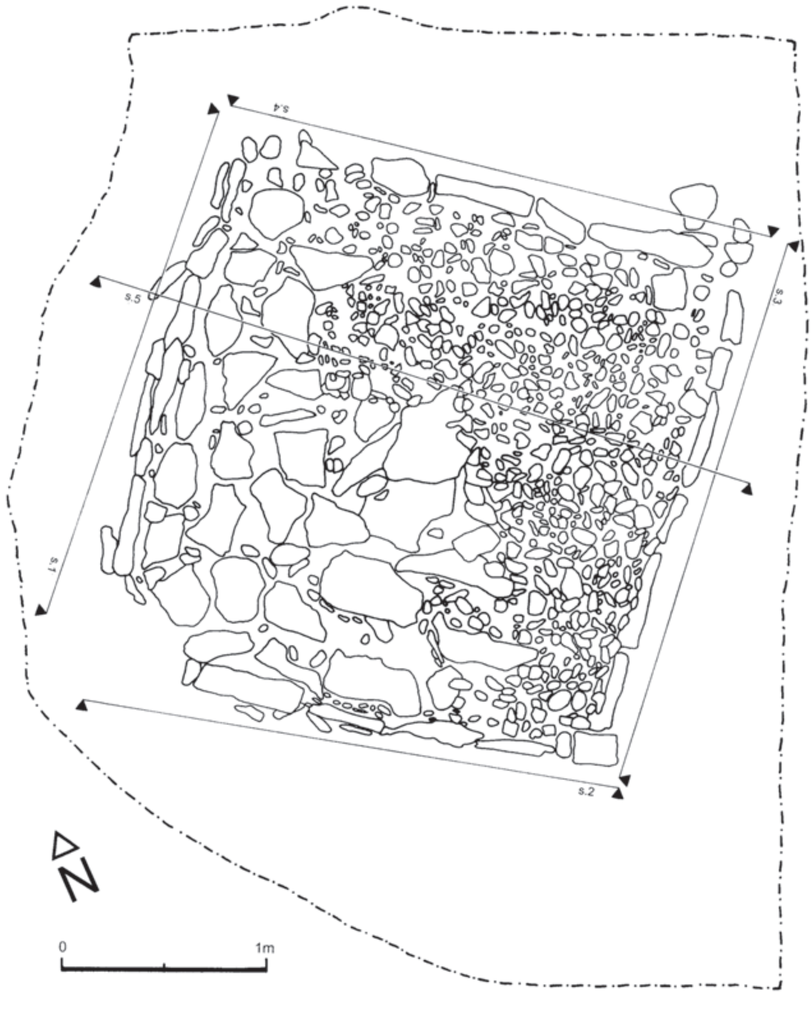


Figure 2.9. Positions of section and elevation lines on the cairn

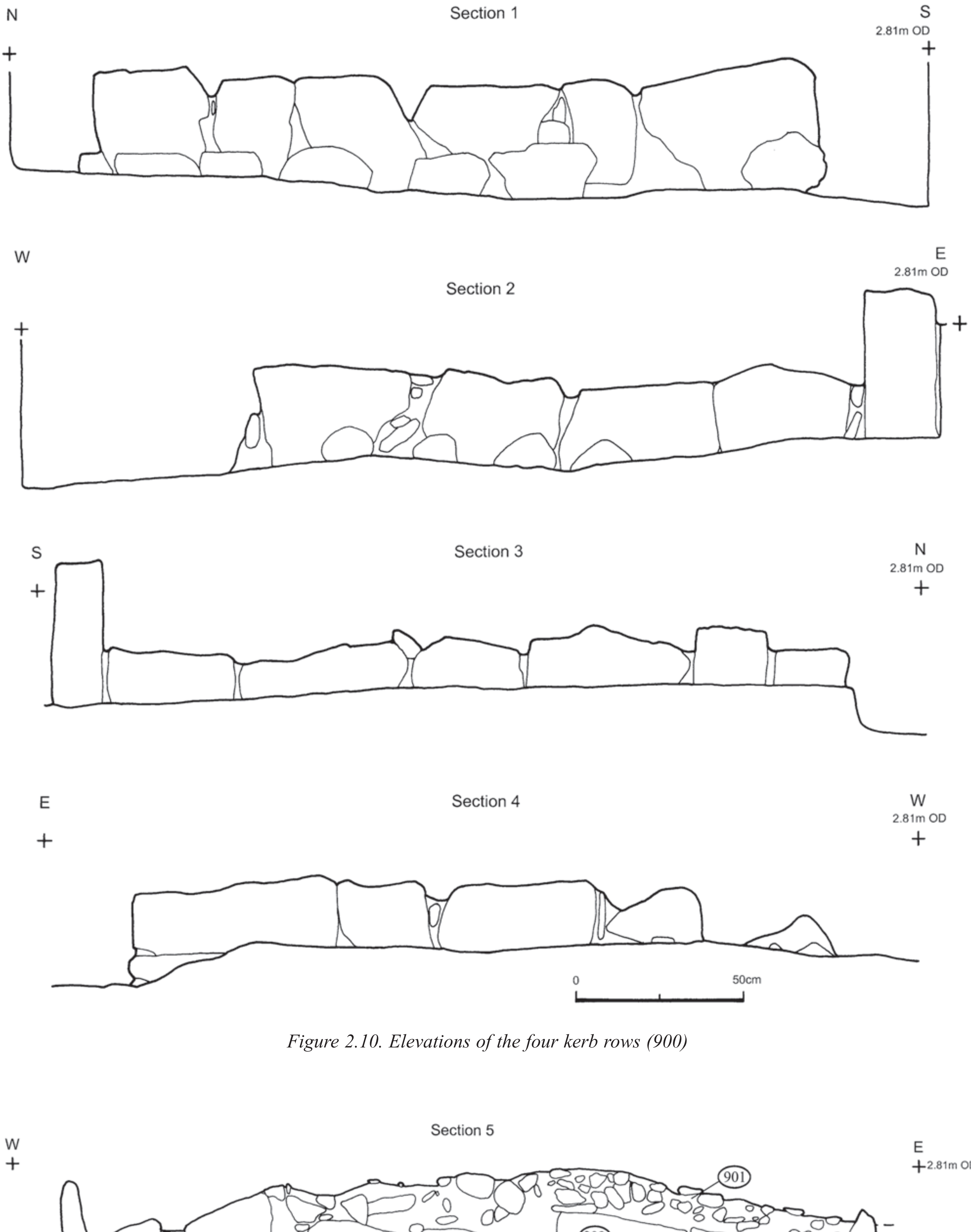


Figure 2.10. Elevations of the four kerb rows (900)

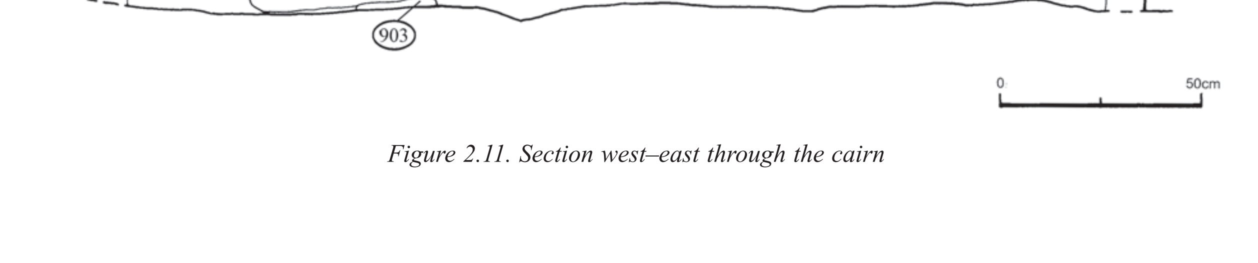


Figure 2.11. Section west–east through the cairn

part of the rites or a desecration, to remove grave goods or, more probably, body parts – perhaps the heart – is unknowable without other burials of the same period and similar location for comparison. During this disturbance, the corpse seems to have been turned onto its left side and might have been propped in place in that position by means of an upright slab placed between the vertebrae and one of the grave slabs on the east side of the grave cut (visible in Figures 2.14–2.15). A space between the slabs (907) marking the northwestern side of the grave may mark the place whence this additional slab was taken.

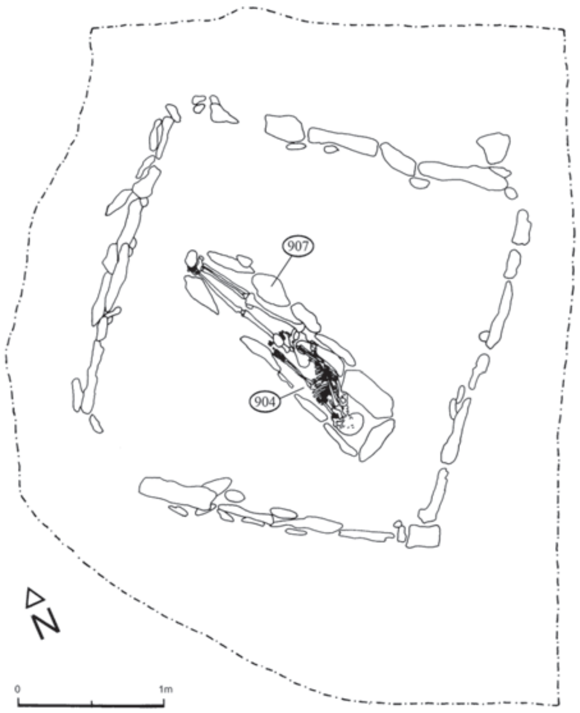


Figure 2.12. Plan of the skeleton in the slab-lined grave within the cairn

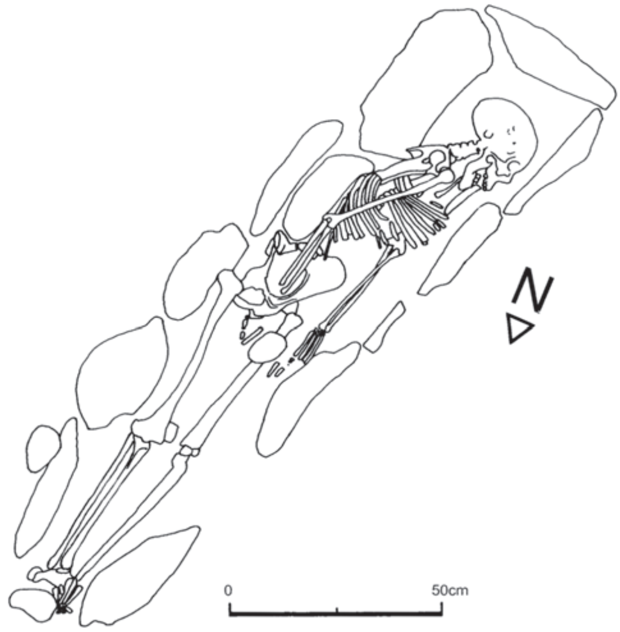


Figure 2.14. Plan of the skeleton and the stone uprights (906) lining the grave

Figure 2.13. The skeleton lying within the grave inside the cairn, seen from the east

Figure 2.15. The skeleton, showing the splayed ribcage and the cobble near the groin, seen from the northeast

2.4 The small mammals in the burial

J. Williams

Introduction and methods

The small mammal bones came from one context and sample from the Pictish burial (context 904 [the grave fill surrounding the skeleton, within the edge slabs 907], sample number 7301). These bones were retrieved from later processing of the residual soil from the excavation, all of which was collected during the excavation and then sieved and sorted in the laboratory. All identifiable bones were counted and recorded, and species identification, where possible, carried out. A full methodology is described in the main small mammal section in Chapter 18. Additional study of bone modification of the small mammal bones from this context was carried out under a scanning electron microscope within an environmental chamber using a secondary electron detector.

Results

Skeletal element description

Both cranial and post-cranial remains are present. The cranial remains contain two unidentifiable skull fragments, one isolated upper incisor, three isolated lower incisors and two left mandibles, one of which contains two molars which enabled the identification of that mandible as wood mouse (*Apodemus sylvaticus*). It has not been possible to identify the other mandible, although it is of a similar size, and could be a wood mouse, house mouse (*Mus domesticus*) or field vole (*Microtus agrestis*). None of the other bones are identifiable to species level but the post-cranial remains are of a comparable size to the three species mentioned above.

The post-cranial remains comprise three scapulae, three ulnas, two radii, five humeri, two pelves, three femurs, four tibiae, one fibula, 39 vertebrae and 11 caudal vertebrae. Also within the post-cranial assemblage are 10 ribs, one clavicle, 12 metapodials, three podials and two unfused epiphyseal ends. All of this evidence suggests that the deposit is comprised of a minimum number of two individuals.

Bone breakage

Over 50% of the bones from the grave fill show signs of damage. Breakage is evident on the two mandibles, both of which are missing their ascending ramus and have also lost the inferior border, the bottom part of the jaw. The loss of the inferior border has then led to the separation of the lower incisors from the jaws, although it is presumed that these are represented amongst the three lower incisors recorded from this site.

Bone modification

There is evidence of extensive bone modification throughout this assemblage. It is visible on all the teeth, both the incisors and the molars. The teeth have patches of missing enamel, and evidence of weaving root lines can be seen on the incisors and on 13 of the long bones. It is likely that this modification has been caused by root action, and further exacerbated by poor post-depositional burial conditions, with changing hydrological conditions. Where the enamel survives on the incisors, there is no evidence of other modification, such as that produced by acid and enzymatic activity associated with predator assemblages (Andrews 1990; Denys *et al.* 1996). It is only possible to see this through the use of a scanning electron microscope.

The holes on the long bones also appear to derive from post-depositional degradation and root action on the bone, rather than from puncture of the bone followed by post-depositional changes. This interpretation is mainly based on the lack of any concave indentation associated with any hole, and no sign of cracking of the bone. This would further suggest that there is no evidence of predator involvement in the accumulation of this assemblage.

Discussion and conclusions

This sample contains a minimum of two small mammals (from the presence of two left mandibles), one of which is positively identified as a wood mouse. The other mandible may be from the same species or from another, similar-sized small mammal, such as a house mouse or field vole. The

small mammal fauna of South Uist is restricted to only four species (Yalden 1982), the three listed above and the pigmy shrew (*Sorex minutus*).

All of the bones within this assemblage are badly preserved and there is evidence of bone breakage and modification resulting from root action. Bone breakage and bone modification analysis is often used to attempt to ascribe a predator origin to the small mammal assemblage. In this context, however, no evidence can be found that would clearly indicate a predator origin.

2.5 The human skeleton

A. Chamberlain with K. Fitzmaurice, G. Greene and V. Parsons

Summary

The skeleton excavated from the Pictish cairn is that of a woman, aged in her late 30s or early 40s, about 172cm in stature and right-handed. The woman suffered from degenerative joint disease in her spine, her hands and at the temporo-mandibular joints, and she had partial fusion of two of the vertebrae in the neck. The sternum was absent from the burial, and the position of the ribs and clavicles indicates that the sternum might have been removed after the final deposition of the body. Some bones of the right hand were present in the expected area, below the right wrist, in the groin area, where the right arm was lying when excavated, but other bones of the right hand were recovered from the region of the thorax, again suggesting peri-mortem manipulation of parts of the body.

Skeletal inventory

The skeleton is almost complete, apart from a few teeth and some of the small bones of the hands and feet (which are easily disturbed in burials). The only notable missing item is the sternum; neither the manubrium nor the body of the sternum was retrieved from the burial context. The significance of the absence of the sternum is discussed at the end of this report. The posture of the body within the grave resulted in the bones of the left side of the skeleton being more deeply buried; the consequent closer proximity to the water table has resulted in this side of the skeleton being less well preserved.

Table 2.1. Estimation from molar attrition of the age at death of the woman buried in the Pictish cairn

Mandibular molars			
Left M1	22–26	Right M1	30
Left M2	36–40	Right M2	32–36
Left M3	52–54	Right M3	52–54
Maxillary molars			
Left M1		Right M1	32–36
Left M2	26–30	Right M2	30–34
Left M3	44–48	Right M3	42–46

Skull

The skull is complete but the face bones are fragmentary and are detached from the cranium. A small region (20mm × 15mm) on the left parietal eminence is encrusted with a dark brown substance. The mandible has a post-mortem break through the mandibular symphysis. All teeth are present except for the upper left first molar, upper right second premolar and lower central incisors, all of which were lost ante-mortem, and the upper left central incisor, upper right lateral incisor and lower right premolars for which there are intact sockets, indicating therefore these teeth have been lost post-mortem. A part of the greater horn of the hyoid bone and an isolated bone from the middle ear were recovered from sieved sand from around the cranium.

Axial skeleton and upper limbs

All vertebrae are present but the lower thoracic and lumbar vertebrae are very fragmentary. Twelve ribs are present on each side and the well-preserved right second rib was used as a bone sample for radiocarbon dating. The clavicles are complete, apart from the damaged lateral end of the right clavicle. Both scapulas are complete but are fragmentary. The right and left humerus are complete but have fragmentary proximal epiphyses. The right and left

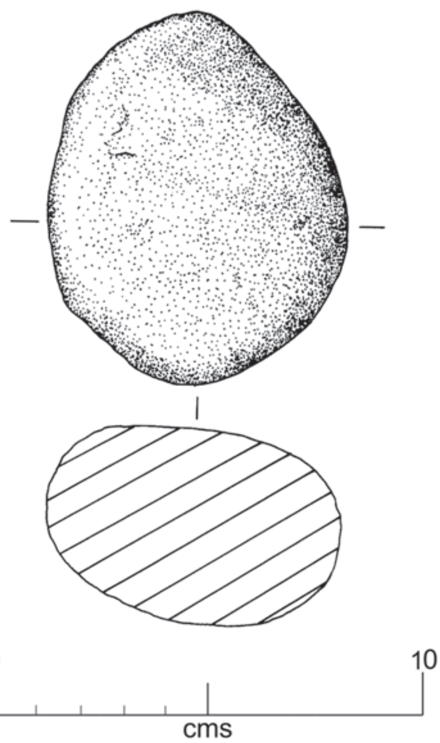


Figure 2.16. The cobble found in the grave

radius and ulna are complete, apart from the distal ends of the ulnas. The left hand is represented by six carpals (trapezium, capitate, hamate, lunate and fragments of two other carpals), all five metacarpals, proximal phalanges 2 to 5, middle phalanges 2 to 4 and distal phalanges 1 to 4.

For the right hand, the scaphoid and first, second and third metacarpals were recovered from the chest cavity; the remaining elements present – the pisiform, fifth metacarpal, proximal phalanges (first and three others), three middle phalanges, the first distal phalanx and three other distal phalanges – were recovered from the area around the hips (as would be expected given the position at the time of discovery of the right arm; see Figures 2.12–2.15).

Pelvis and lower limbs

The left and right hip-bones are complete, apart from the pubic symphysis, which has not survived on the right side and is too eroded on the left side to allow the estimation of age at death. The sacrum is complete but fragmentary in the region of the auricular surfaces. The coccyx is not present. The right and left femurs, tibias and fibulas are complete but fragmentary at proximal and distal ends: the bones on the right side are sufficiently well preserved to allow measurements of length. Both patellas are present. The left foot is represented by the calcaneus, talus, cuboid, fragments of other tarsals, and all five metatarsals. The right foot comprises calcaneus, talus, all five metatarsals and fragments of other tarsals and phalanges.

Age at death

Age at death was estimated from the attrition of the teeth (Table 2.1) and from changes at the auricular surfaces of the hip bones. The state of fusion of the skeletal secondary growth centres and of the cranial sutures was also considered in order to corroborate the dental and auricular surface age indicators. The lower left first molar shows an abnormally low degree of wear because the opposing upper first molar was lost before death. The remaining molars have wear consistent with a wide range of possible ages; it is notable that the usual pattern of greatest wear on the anterior molars is reversed in this individual and, instead, the third molars show the greatest amounts of attritional wear. We suggest, therefore, that the second molars may provide the most reliable age estimates: these range from 30 to 40 years of age.

The auricular surfaces show changes that are characteristic of individuals between 35 and 45 years old, and the state of fusion of the cranial sutures (coronal and sagittal sutures in the process of fusing) is also typical of an individual in her late thirties or early forties. The complete fusion of all epiphyses, including the medial ends of the clavicles and the individual segments of the sacrum, confirms an age at death greater than 30 years.

Estimation of sex

Sex was estimated from morphological characteristics of the skull and the pelvis. The skull characters are exclusively female, and include diagnostic and reliable features such as absence of supraorbital ridges, low zygomatic, small mental protuberance, obtuse mandibular angle and small and inflected mastoid processes. The pelvis exhibits a mixture of sex-diagnostic characters, but a majority of the features are female and include usually reliable characters such as broad sciatic notch, pre-auricular sulcus and elongated pubic bones. The size of the postcranial bones is also consistent with a female attribution.

Stature

Stature has been estimated independently from the lengths of each of the long bones (Table 2.2) and, when averaged, these converge on an estimate of 172.5cm (5 feet 7½ inches). The estimates based on the bones of the lower limb only, which are generally more reliable, provide a stature estimate of 172cm.

Handedness

Many of the bones from the right side of the skeleton are more robust than the corresponding paired elements on the left side. Bones that clearly demonstrate this right-side hypertrophy are mainly in the upper limb, and include the clavicle, humerus, radius, ulna, but the right femur is also

Figure 2.17. The cobble in situ in the grave

Table 2.2. Post-cranial measurements and estimation of stature of the woman buried in the Pictish cairn

	Left (mm)	Right (mm)	Stature (cm)
Clavicle	158	–	–
Humerus	–	343	173
Radius	250	252	174
Ulna	[270]	[270]	173
Femur	–	475	172
Tibia	–	380	172
Fibula	–	380	171
Average (all long bones)			172.5

more robust than its antimere. In addition, degenerative changes are more evident in joint surfaces on the right side, particularly at the sterno-clavicular and carpo-metacarpal joints and in the vertebral column. These features are consistent with a strong preference for the use of the right side of the body in tasks requiring strength.

Skeletal pathology

Degenerative changes were noted in many of the joints between adjacent vertebrae. The cervical vertebrae showed slight lipping of the facet joints and C2 is fused to C3 at the facet joint on the right side. The thoracic vertebrae have lipping of the facet joints and degeneration of the upper and lower surfaces of the vertebral bodies from T5/T6 downwards. The fragmentary lumbar vertebrae also show degenerative joint disease and there is extensive lipping and pitting on the adjacent surfaces of the bodies of L5 and S1. Degenerative changes are also present at the right and left side temporo-mandibular joints and on the distal surface of the right first metacarpal which exhibits slight eburnation.

Dental pathology

There is no evidence of dental caries or of periapical abscesses. There are heavy deposits of dental calculus on the buccal and lingual surfaces of all of the teeth, and there is some resorption of the alveolar margins, particularly where the calculus development is heaviest, perhaps indicating periodontal disease.

The lower central incisors were lost well before the death of the individual, as shown by complete remodelling of their alveoli and proximal movement of the adjacent lateral incisors. The symmetrical loss of these teeth may be attributable to deliberate tooth avulsion, which is sometimes conducted for ritual or cosmetic reasons. Alternatively, these teeth might have been lost through injury. The loss of the upper left first molar and upper right second premolar might have been through dental disease, although none of the surviving teeth show evidence of dental caries. Trauma might also have led to the loss of these teeth from the upper jaw.

Discussion

The absence of the sternum is notable, given the completeness of the rest of the skeleton. Other than the sternum, the only elements that are not represented in the skeletal inventory are some of the small bones of the hands and feet, the coccyx, and a few isolated teeth. It is unlikely that the sternum has decayed completely through natural post-depositional processes. Although the sternum consists mainly of weak cancellous bone, the upper part of the manubrium has some robust cortical bone, and other regions of the skeleton with predominantly spongy bone (*e.g.* the vertebral bodies) have survived more or less intact. Other bones that articulate directly with the sternum are present and complete (*e.g.* the medial ends of the clavicles), and even the delicate hyoid bone from the region of the larynx has survived.

A more probable scenario than total decay is that the sternum was removed or severely damaged either prior to the primary inhumation or, more likely, during a phase of disturbance soon after burial. This would account for the position of the ribs in the inhumation, which deviate from their natural anatomical position. As is visible in Figures 2.14 and 2.15, it was recorded during excavation that the left ribs were displaced laterally and the right ribs were displaced inferiorly, a situation that would not usually occur even in a coffined burial, but would be more likely to result if the normal articulation between the ribs and clavicles via the sternum had been severed. No evidence of cuts or chop-marks was seen on the ribs or the clavicles, but the delicate medial ends of most of the ribs have been lost through post-depositional erosion.

The left hand was tightly clenched, resulting in the distal phalanges resting in an inverted position over the heads of the metacarpals. Some bones of the right hand (the scaphoid and first, second and third metacarpals) were recovered from positions within or on top of the thoracic cavity. The remainder of the right hand's bones were recovered from more conventional positions, just below the pelvic region. There are several possible explanations for the anomalous position of the bones of the right hand:

- They might have been displaced through bioturbation, particularly if burrowing animals (such as rats, rabbits or underground nesting birds) had access to the interior of the cairn. However, such animals usually disturb bones in a random manner after complete decay of the connective tissues, and the presence of several adjacent metacarpals in the thoracic cavity would therefore be unlikely to result from such intrusion. Furthermore, the excavators recorded no evidence of any such burrowing: had animal disturbance affected the burial, it would have been noted since rabbit damage in particular was a known problem to be taken into account on all machair sites.
- A second possibility is that the right arm was originally positioned in a flexed posture with the hand resting on the thorax. At a later date, and perhaps after the body had partially decayed, the arm could have been moved to the extended position seen when the skeleton was excavated, with a few bones from the palm of the right hand remaining in the thoracic region. Such post-mortem manipulation of the cadaver could have been contemporaneous with the removal of the sternum.
- A third possibility is that secondary disturbance of the grave, perhaps by people seeking grave goods, resulted in a cluster of bones from the right hand being removed from their original context and then discarded onto the thorax.

The arthritic changes in the skeleton indicate that the individual – probably a woman in her late thirties or forties – undertook physical activities that imposed moderately stressful loading on the spine. The arthritis in the facet

Table 2.3. Radiocarbon and isotope results for the Pictish burial

Laboratory code	Context	Material	Radiocarbon age BP	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	C:N ratio	Calibrated date range (95% confidence)
AA-48605	KIL 908	Human bone, rib	1325±45	-21.8	10.7	3.4	cal AD 640–780

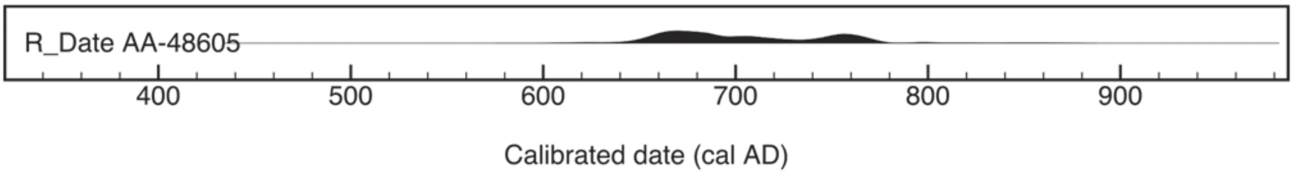


Figure 2.18. Probability distribution of the date from the Pictish burial. The distribution represents the relative probability that the event occurred at a particular time. This distribution is the result of simple radiocarbon calibration (Stuiver and Reimer 1993)

joints of the cervical vertebrae and the fusion of C2 and C3 suggest load-bearing on the head, perhaps from supporting a strap across the forehead to counterbalance loads carried on the back. There is also advanced degenerative change at the first carpo-metacarpal joint in the right hand, indicating repetitive loading of the thumb such as could occur from using a rotary hand-quern.

Some indications of the woman's diet can be inferred from the pattern of dental attrition and deposition of dental calculus. The anomalous pattern of molar wear must have been caused by preferential use of the third molars for food processing or for non-dietary activities. These posterior molars are not usually employed for processing raw materials (such as hide-chewing) because of their less accessible location in the mouth. This wear pattern is more likely to have been caused by the consumption of small food items requiring prolonged mastication, such as shellfish. The heavy deposits of dental calculus and absence of tooth decay suggest a high protein diet with low levels of dietary carbohydrates, consistent with a partial dependence on marine resources. Isotopic analysis of bone (see below) refutes this hypothesis, however, since a significant marine protein dietary source would have caused elevated levels of $\delta^{13}C$ and $\delta^{15}N$ levels.

2.6 Radiocarbon and stable isotope analysis

P. Marshall

A single rib bone from the skeleton was processed by SUERC using a modified Longin method (Longin 1971), converted to carbon dioxide in pre-cleaned sealed quartz tubes (Vandeputte *et al.* 1996), and graphitized as described by Slota *et al.* (1987). The sample was measured by accelerator mass spectrometry at the University of Arizona (Donahue *et al.* 1997) in 2003.

The laboratory maintains a continual programme of quality assurance procedures, in addition to participation in international comparisons (Scott 2003). These tests indicate no significant offsets and demonstrate the validity of the precision quoted.

Result

The result of 1325±45 BP (cal AD 640–780, given in Table 2.3) is a conventional radiocarbon age (Stuiver and Polach 1977) and is quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986).

Calibration

The calibration of the result, relating the radiocarbon measurement directly to a calendar date, is given in Table 2.3 and in Figure 2.18. Both have been calculated using the calibration curve of Reimer *et al.* (2009) and the computer program OxCal v4.1.5 (Bronk Ramsey 1995; 1998; 2001; 2008). The calibrated date range of AD 640–780 is that for 95% confidence. It is quoted in the form recommended by Mook (1986), with the end points rounded outwards to 10 years. The probability distribution (Figure 2.18) is derived from the usual probability method (Stuiver and Reimer 1993).

Stable isotope measurements

The ratio of carbon isotopes is used to distinguish between a marine protein diet (expected consumer's $\delta^{13}C$ -12‰) and a C3 plant protein diet (most vegetables, fruits and wheat; expected consumer's $\delta^{13}C$ -20‰; Schwarcz and Schoeninger 1991). Carbon isotope values between -12‰ and -20‰ indicate consumption of a mixture of marine and terrestrial resources.

Nitrogen isotopes are primarily used to determine the input of plant versus animal protein in the diet, although

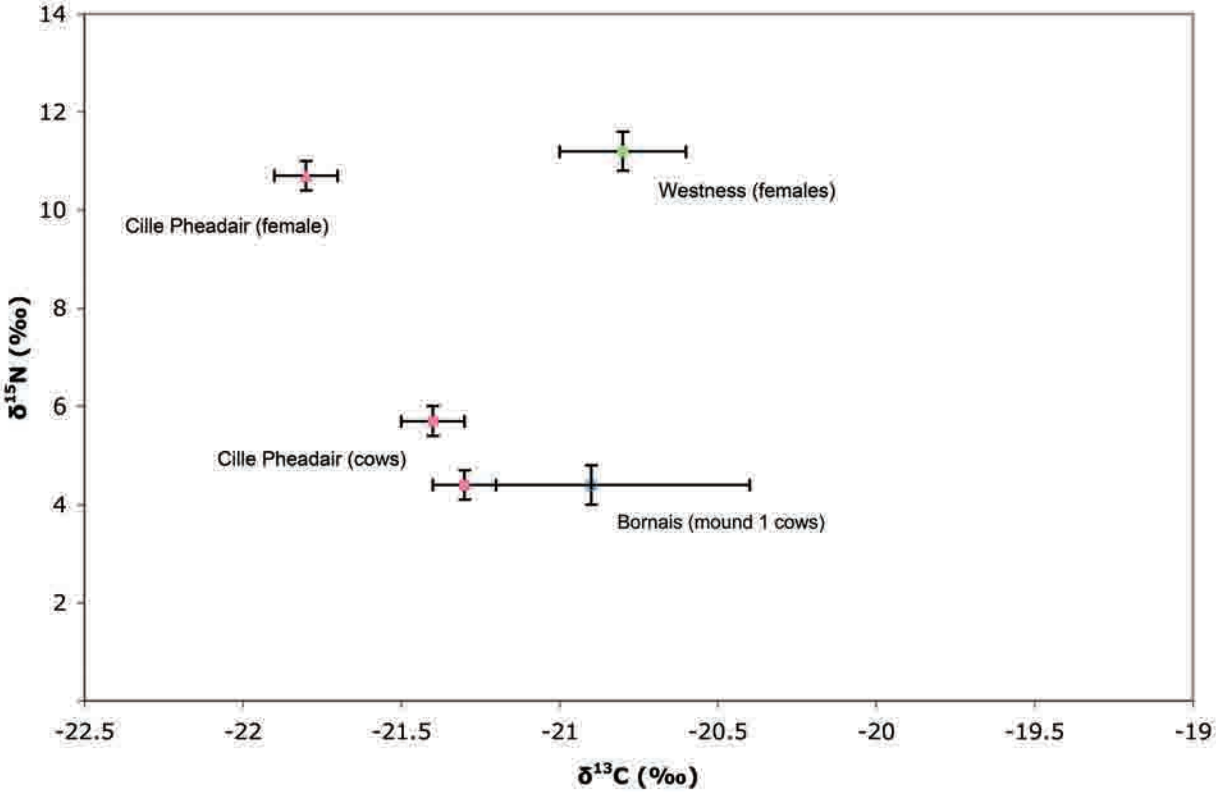


Figure 2.19. Plot of human and cattle bone collagen $\delta^{13}C$ and $\delta^{15}N$ values from Cille Pheadair. Also included are the mean values for cattle from Bornais Mound 1 (Sharples 2012b) and Pictish females from Westness, Orkney (Barrett and Richards 2004)

there is some evidence that $\delta^{15}N$ values are also influenced by the nitrogen balance of an organism (Fuller *et al.* 2004). In an ecosystem, each step up the food chain results in consumer tissue, in this case bone collagen, being enriched in $\delta^{15}N$ by approximately 3–4‰ relative to diet (Schoeninger and DeNiro 1984). Thus people who eat more animal protein compared to plant protein will display higher $\delta^{15}N$ values (O'Connell and Hedges 1999).

The $\delta^{13}C$ value in Figure 2.19 (human bone sample; Table 2.3) shows that the diet of the woman buried in the Pictish cairn was predominantly terrestrial, with perhaps a very small marine component.

The C:N ratio of the bone sample suggests that bone preservation was sufficiently good to have confidence in the radiocarbon determinations (DeNiro 1985).

2.7 Combined lead, strontium and oxygen isotope analysis

J. Montgomery, J. Evans and C. Chenery

The origins of the individual (probably an adult woman) whose skeleton was excavated from the Pictish cairn at Cille Pheadair were investigated as part of a wider study on prehistoric and ancient Hebridean population movement (Montgomery 2002; Montgomery and Evans 2006; Montgomery *et al.* 2003; 2007b; 2007c), using the permanent first and second left mandibular molars.

Isotope analysis of archaeological human remains can provide evidence of their geographical origins (*e.g.* Molleson *et al.* 1986; Price and Gestsdottir 2006; Sealy *et al.* 1995; White *et al.* 1998). Chemical elements from ingested food and water are incorporated into teeth and bones: because the isotope ratios of some elements vary geographically, and on the assumption that ancient people sourced the bulk of their diet locally, these differences can be used in the interpretation of the isotopic analysis of human remains to draw conclusions about whether individuals were of local or non-local origin in relation to their place of retrieval by archaeologists (usually equating to their place of burial). Tooth enamel, a skeletal tissue that is highly resistant to alteration during life and burial (Ericson 1993; Trickett *et al.* 2003; Wang and Cerling 1994), is thus analysed in this study to investigate childhood origins and diet.

Strontium derives from rocks and its isotope ratios are indicative of the geology of the home region (Bentley 2006; Price *et al.* 2002) whilst oxygen varies geographically with latitude, altitude and distance from the sea and provides an indication of the climatic regime prevailing in the home region (Darling and Talbot 2003; Darling *et al.* 2003; Fricke *et al.* 1995). As outlined for strontium, lead isotopes record the geological origin of the lead and enter the food chain through soils, water, plants and animals. For skeletal material dating to periods prior to the large-scale metal production and transport that occurred during the Roman period, lead may provide similar information to strontium. However, following the widespread extraction and use of

lead ore for metal products, which occurred in England during the Roman period (Budd *et al.* 2004; Montgomery 2002; Tylecote 1992), the natural lead signature of humans is frequently swamped by anthropogenic lead and provides evidence of the cultural sphere they inhabited rather than their geographical origin. In conjunction with the levels of lead present in the skeleton, the lead isotope ratio can, therefore, provide information about an individual's exposure to anthropogenic metals and pollution, and may be able to discriminate between urban and rural populations (Montgomery 2002; Montgomery *et al.* 2005).

Geology and environment of the Outer Hebrides

The Outer Hebrides are composed almost entirely of rocks from the Lewisian complex that were formed around 2,700 million years ago and are thus one of the oldest rock groups in Europe (Ager 1980; British Geological Survey 2001). They are intensely metamorphosed grey quartz–feldspar gneisses (Hall 1996) that have been eroded to form a series of low, fragmented islands with few remaining hills of any great height (Armit 1996; British Geological Survey 2001). On land, there are no younger rocks, apart from the Permo-Triassic sandstones and conglomerates which are restricted to the Stornoway basin on the east coast of Lewis and a few basic igneous dykes of Permo-Carboniferous and early Tertiary age (British Geological Survey 2001; Hall 1996). The direction of deglaciation during the last Ice Age appears to be towards the Scottish mainland and the most widespread landforms of glacial deposition are mounds composed of blocky till derived from erosion of local bedrock (Hall 1996). It is, therefore, unlikely that glacial drift deposits, composed of younger lithologies from the mainland and islands in between, cover the Lewisian gneiss.

The Lewisian gneiss produces a barren landscape with thin, acid soils of limited agricultural value and the vast majority of the island chain's interior is covered with extensive Quaternary deposits of peat. In addition to the blanket peat, many areas of the west coast of the islands are covered with windblown, calcareous shell sand, known as machair. The machair is particularly extensive on the southerly islands of Harris and the Uists, with scattered areas elsewhere, such as those in the region of the Cnip headland on Lewis.

The machair plain consists of a shell-rich (40–80%), blown sand base with a lime-rich soil (pH >7.0) and the system includes strandline, dunes and flat grasslands adjoining the transitional 'blackland' area between the machair and the moorland (Love nd; Owen *et al.* 1996). Deposition of the machair sand created the basal layers of a coastal plain in 4050–3890 BC (Gilbertson *et al.* 1999; Ritchie *et al*. 2001; Edwards *et al*. 2005).

Evidence presented by Gilbertson and his fellow researchers suggests that stratigraphic layers of thick organic materials that occur within the calcareous sand are anthropogenic in origin (and certainly post-Neolithic) and result from attempts to improve the machair by the addition of organic waste and fertilizers. The periods of stability are associated with these organic layers and suggest that survival of the machair system is partly dependent upon human agricultural activity and not periods of relatively calm weather (Gilbertson *et al.* 1999). The machair environment is, nevertheless, a dynamic system where erosion and deposition occur naturally. Consequently, episodic wind-storms and the unremitting, high average wind speeds characteristic of the Hebridean climate both contribute to the formation of the machair habitat and threaten its stability (Owen *et al.* 1996).

Settlement and agriculture appear to have concentrated progressively on the machair from the Early Bronze Age and, by the Iron Age, were largely restricted to machair coastal regions with the bare rock and blanket peat of the interior exploited less intensively (Armit 1996; Graham-Campbell and Batey 1998; Owen *et al.* 1996; for South Uist settlement distribution see Parker Pearson 2012b). It is likely that the Outer Hebrides has always been a marginal area for agriculture (Armit 1998). Although machair soils are particularly poor in organic matter, phosphates, nitrates and many minerals, the application of fertilizers such as seaweed and bone can create relatively productive soils compared to the alternative option of the peaty, wet, acid soils of the inland and upland areas (Graham-Campbell and Batey 1998; Owen *et al.* 1996; Smith 2012).

Materials and methods

The permanent first and second left mandibular molars were selected for isotope analysis. Crown formation times for these teeth span several years from before birth to 4 years for the first mandibular molar (M_1) and from 2½–8 years for the second mandibular molar (M_2) but exact times will vary between individuals (Gustafson and Koch 1974). For humans, precisely when during this period the enamel mineralizes and, therefore, how old the individual was when they were exposed to the lead, strontium and oxygen extracted for analysis, is not well constrained (see discussion in Montgomery 2002). Bulk samples of enamel were removed from each tooth and should be considered as representing a time-averaged signal over most of the period of crown formation.

Enamel samples were removed using tungsten carbide dental bits following the procedure outlined in Montgomery (2002). They were sealed in containers and removed to the clean laboratory suite at the NERC Isotope Geosciences Laboratory at Keyworth, Nottingham, UK. The isotope compositions of strontium were measured using a Finnigan MAT262 thermal ionization multi-collector mass spectrometer. The reproducibility of the international strontium standard, NBS 987, during a period of analysis did not exceed ±0.000030 (2σ) or ±0.004% (2σ). All samples were corrected to the accepted value of $^{87}Sr/^{86}Sr = 0.710250$ to ensure that there was no induced bias through mass spectrometer drift. Strontium isotope data are presented as $^{87}Sr/^{86}Sr$ ratios. Lead isotope fractionation was monitored with suitable-sized (20ng) runs using NBS981 and data were

Table 2.4. Isotope data from enamel samples of the woman buried in the Pictish cairn

Sample	Tooth	Pb ppm	$^{206}Pb/^{204}Pb$[1]	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$	$^{207}Pb/^{206}Pb$	$^{208}Pb/^{206}Pb$
K1	M_1 left	0.045	18.08	15.6	38.14	2.108	0.862
K2	M_2 left	0.052	18.27	15.66	38.45	2.102	0.857

Sample	Tooth	Sr ppm	$^{87}Sr/^{86}Sr$[2]	$\delta^{18}O_{bp}$‰[3]	$\delta^{18}O_{dw}$‰[4]
K1	M_1 left	126	0.70921	17.23	-7.75
K2	M_2 left	130	0.70888	17.83	-6.47

[1] External reproducibility, based on repeated determinations of the NBS981 standard (2σ, n=19), was estimated at: ±0.15% for $^{208}Pb/^{204}Pb$; ±0.11% for $^{207}Pb/^{204}Pb$; ±0.07% for $^{206}Pb/^{204}Pb$; ±0.04% for $^{207}Pb/^{206}Pb$; and ±0.08% for $^{208}Pb/^{206}Pb$; (2σ, n=19).

[2] External reproducibility was estimated at ±0.004% (2σ).

[3] External and sample reproducibility was estimated at ±0.18‰ (1σ)

[4] Calculated using Levinson's equation (Levinson *et al.* 1987) after correction for the difference between the average published values for NBS120C and NBS120B used by Levinson. For comparison, equation 4 in Daux *et al.* (2008) produces a calibrated rainwater ratio of -6.47‰ (K1) and -7.44‰ (K2).

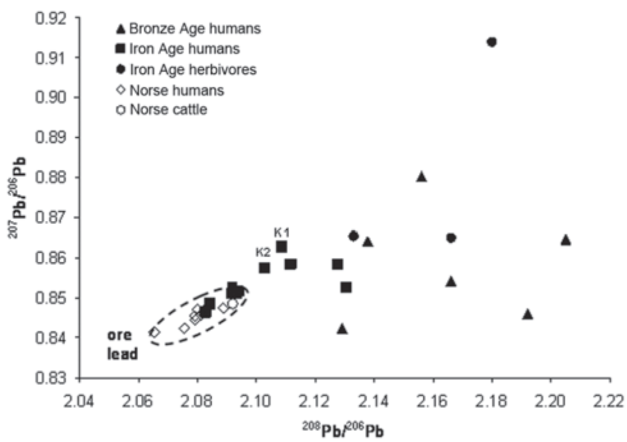


Figure 2.20. Plot of $^{207}Pb/^{206}Pb$ against $^{208}Pb/^{206}Pb$. Individuals within the dashed oval are consistent with sources of lead ore in England, Wales and some Irish sources but not with Scottish ores (Rohl 1996). Note the highly variable and dispersed isotope ratios of the majority of prehistoric humans and animals which indicate exposure to natural country rock sources rather than anthropogenic lead sources. K1 is the first molar and K2 the second molar from the Pictish burial. 2σ analytical errors are contained within the symbols. Additional data sources: Montgomery 2002; Montgomery et al. 2007b; Parker Pearson et al. 2005

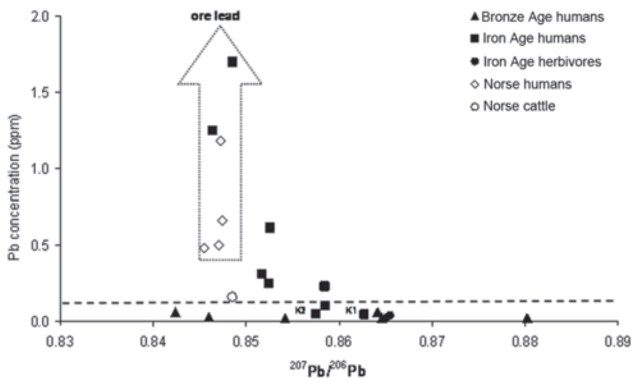


Figure 2.21. Plot of $^{207}Pb/^{206}Pb$ against lead concentrations. The horizontal dashed line indicates the greatest amount of lead that is normally present in the enamel of prehistoric individuals with no exposure to pollutant lead. In Britain, individuals with levels of lead greater than ~0.7 ppm almost always have a lead isotope ratio of ~0.846 which is consistent with English, Welsh and some Irish lead ore sources (Rohl 1996) as highlighted within the dotted arrow. The two teeth from the Cille Pheadair skeleton (K1 and K2) indicate negligible access to anthropogenic lead sources during childhood. Additional data sources: Montgomery 2002; Parker Pearson et al. 2005

corrected for fractionation using the associated standards run. For reproducibility, see notes to Table 2.4. Laboratory contamination, monitored by procedural blanks for both lead and strontium, was negligible.

Phosphate oxygen was extracted from enamel bio-apatite and converted to silver phosphate for analysis using a modified method of O'Neil *et al.* (1994). Analytical measurement was by continuous flow isotope ratio mass spectrometry (CFIRMS) using a TC/EA (high-temperature conversion elemental analyser) coupled to a Thermo Finnigan Delta Plus XL isotope ratio mass spectrometer via a ConFlo III interface. The sample was analysed in triplicate, corrected and converted to the SMOW scale against NBS120C in-house reference material. The reproducibility over the analytical period for NBS120C and 'batch control' ACC1 were ±0.18 and ±0.15‰ respectively. Full details of analytical method and calculations are given in Chenery (2005).

Results

Results are displayed in Table 2.4 and Figures 2.20–2.23. In the plots, the first permanent molar is labelled K1 and the second permanent molar K2. The skeleton is referred to below as KK, when compared with other burials.

Lead

The lead data obtained from the two teeth are plotted in Figures 2.20 and 2.21, along with data obtained from Bronze Age, Iron Age and Norse humans and animals excavated from the Outer Hebrides (Montgomery 2002; Montgomery *et al*. 2007b; 2007c).

Figure 2.20 shows that all the Norse individuals, the Norse cattle and several of the Iron Age individuals cluster very tightly in a region on the plot which is consistent with ore lead from English, Welsh and some Irish (but not Scottish) ore sources (Rohl 1996). KK falls outside this field as do all the Bronze Age humans, the Iron Age herbivores and some Iron Age humans. This suggests that she had no exposure to anthropogenic sources of lead and this is confirmed in Figure 2.21, which shows the very low level of lead in both teeth. Once again, this is consistent with the Bronze Age humans, Iron Age herbivores and some of the Iron Age humans from the Hebrides and most prehistoric individuals analysed from Britain (Evans *et al.* 2012).

We have interpreted low (*i.e.* < 1 ppm) levels of lead, coupled with highly variable ratios, as the result of exposure to natural sources of lead from country rocks and the high levels of lead, coupled with ore-type lead, as arising from anthropogenic exposure (Budd *et al.* 2004; Montgomery 2002; Montgomery *et al.* 2005). It appears that, in Great Britain, levels of lead above 1ppm can only be obtained through exposure to anthropogenic sources of lead with a $^{207}Pb/^{206}Pb$ ratio approximately equal to 0.846. We have called this phenomenon of decreasing isotope variability with increasing lead exposure 'cultural focusing' and, in England, it appears to have occurred by the Roman period (Montgomery 2002; Montgomery *et al.* 2005); to date, it has not been observed in prehistoric individuals living prior to the first millennium AD. Given the highly variable 'unfocused' nature of the naturally derived lead isotope ratios, the difference between the two teeth of KK (K1 and K2) is not considered significant although it is clearly outside analytical error.

In the Outer Hebrides, individual exposure to lead is evidently quite variable during the Iron Age, extending as the period does until the arrival of the Norse, but the data show that KK was similar to Bronze Age individuals and had virtually no childhood exposure to anthropogenic lead. This suggests a childhood with little or no contact with environmental pollutants or man-made metal artefacts.

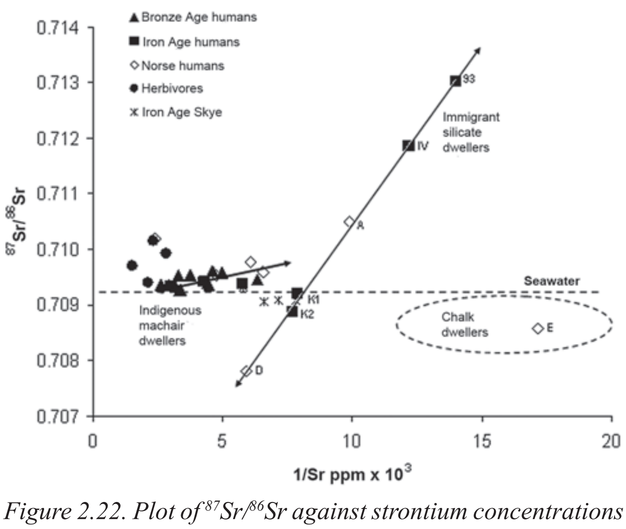


Figure 2.22. Plot of $^{87}Sr/^{86}Sr$ against strontium concentrations (1/Sr ppm). High concentrations are on the left-hand side of the plot, low concentrations on the right. The Hebridean population separates into two main groups: the first, 'indigenous machair dwellers', characterized by high strontium concentrations and marine-dominated isotope ratios; the second, 'immigrant silicate dwellers', by lower concentrations and highly variable strontium ratios that appear to all derive from various mixtures of two types of strontium. This is explained at length elsewhere (Montgomery and Evans 2006; Montgomery et al. 2007c). The Pictish burial (K1 and K2) falls on the non-Hebridean mixing line and does not appear to be consistent with origins in the Outer Hebrides. Additional data sources: Montgomery 2002; Montgomery et al. 2007a; 2007b

Strontium

The two teeth measured had relatively high strontium concentrations of 126 ppm and 130 ppm that are within analytical error and the difference between them is therefore insignificant. The strontium isotope ratios are 0.70921 and 0.70888 and the difference exceeds analytical error at the 2σ level.

The strontium isotope and concentration data obtained from individuals from the Outer Hebrides separates the population into two main groups that we have called 'machair dwellers' and 'silicate dwellers' (Figure 2.22). The strontium concentrations for KK are slightly higher than for the 'machair dwellers' and on one end of the mixing line for the 'silicate dwellers'.

All the Bronze Age individuals (adults and juveniles) and Iron Age herbivores fall within the machair group as do some of the Iron Age and Norse individuals. Such strontium isotope ratios are inconsistent with the ancient Precambrian gneiss of which the Outer Hebrides are predominantly composed, and appear to be dominated by strontium of modern marine origin that has a strontium isotope ratio of ~0.7092 throughout all the oceans of the world (Veizer 1989). High strontium concentrations such as those of the Hebridean 'machair dwellers' are rarely found in archaeological or modern human tooth enamel from inland sites (Curzon and Cutress 1983; *e.g.* Evans and Tatham 2004; Evans *et al.* 2006a; 2006b; Losee *et al.* 1974; Montgomery 2002; Montgomery *et al.* 2005; 2007a; 2009) but have been obtained from modern individuals living on Tonga (Brudevold and Söremark 1967).

We have argued elsewhere that, when coupled with a marine-strontium isotope signature, such as that observed in our 'machair' group from the Hebrides,

high strontium ratios are indicative of coastal-dwelling populations (Montgomery 2002; Montgomery and Evans 2006; Montgomery *et al.* 2003; 2007c). However, it is unlikely that this signature derives from eating marine fish or mammals because meat is not considered a rich or dominant source of the strontium in the body unless it is the main food consumed (Burton and Price 1999; Burton and Wright 1995; Elias 1980) and an interpretation suggesting that a diet particularly high in marine protein has produced the signature would not be supported by the stable carbon and nitrogen data from these individuals. It is far more likely to reflect the plant/vegetable components of the diet and the soils on which these were grown, which in the Hebrides during the Iron Age are likely to have been on the machair plain (Owen *et al.* 1996; Smith 2012). As populations from other areas rich in marine carbonates such as chalk – which, like the machair soils, is almost entirely composed of the shells of sea creatures and therefore high in calcium which suppresses strontium uptake – do not appear to have similarly high strontium concentrations (Evans *et al.* 2006a; 2006b; Montgomery 2002; Montgomery *et al.* 2000; 2007a), it is unlikely that crops grown on the machair can account for the high enamel concentrations.

However, machair is light, free-draining and difficult to stabilize in the face of persistent and strong winds; it needs fertilizing and stabilizing (Owen *et al.* 1996; Smith 2012) and, if this is done with seaweed, this may increase the biologically available strontium. Furthermore, crops grown in coastal regions are also subject to wind-blown sea-salt, both deposited directly on the plants themselves and also on the fields in which they grow. The strontium concentration of seawater and natural brines is relatively high (Odum 1957), and ingestion of salt either unintentionally via its inclusion in marine or terrestrial plant foods, or intentionally by collecting it for salting and preserving food, may greatly increase the strontium ingested by humans.

Figure 2.22 shows that KK falls on the silicate dwellers' mixing line and has a different strontium composition to Bronze Age individuals analysed from nearby Cladh Hallan on South Uist and from the Cnip headland on Lewis. This indicates that her origins are unlikely to be in the Outer Hebrides. The earlier-forming first molar (K1) has a marine strontium ratio (~0.7092) that falls on the seawater line but the later-forming second molar (K2) has a lower strontium isotope ratio that cannot be obtained from either the machair or the Lewisian gneiss: to date, we have found no sources of dietary strontium below 0.7092 in the Outer Hebrides.

We have previously suggested that the two possible sources of strontium that would explain the 'immigrant' mixing line occur fairly close by on the Isle of Skye, *i.e.* the basalt and the granite of the Black and Red Cuillins respectively (Evans *et al.* 2009; Montgomery *et al.* 2007c). As can be seen in Figure 2.22, four teeth analysed from an adult female from High Pasture Cave on Skye (Birch *et al.* 2006) have very similar values to KK. Although we have suggested that the individuals on the mixing line originate from silicate terrains, it is possible that the strontium in both the High Pasture Cave woman and in KK could derive from their subsisting on food grown on limestone terrains, such as the Durness limestone of Skye which is probably the most fertile part of the island (Evans *et al.* 2009; Montgomery *et al.* 2007b).

Oxygen

The phosphate oxygen isotope ratio of the first molar was 17.2‰ and that of the second molar was 17.8‰. When these measured ratios are calibrated to rainwater using the equation of Levinson *et al.* (1987) as described above, it results in an oxygen isotope ratio of -7.7‰ and -6.5‰ respectively with an estimated maximum error of ±0.5‰ to account for 2σ analytical and estimated calibration errors. The difference in the oxygen isotope ratios of the two teeth is, therefore, highly likely to reflect a real difference and this is supported by the strontium isotope ratios of these

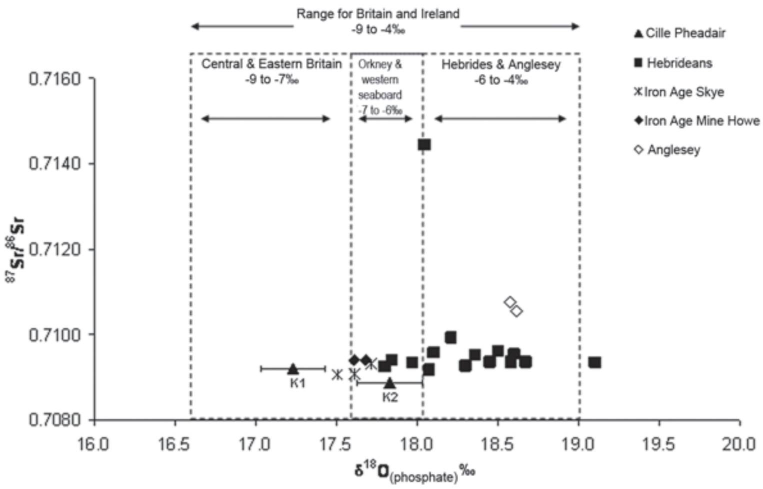


Figure 2.23. Plot of strontium isotope ratios against phosphate oxygen ratios. The two samples for the Pictish burial (K1 and K2) fall outside the oxygen isotope range for the Hebrides. Additional data sources: Montgomery 2002; Montgomery et al. 2007b; 2007c; unpublished data

two teeth that also indicate a change of residence in early childhood, possibly between 4 and 6 years of age. Neither tooth has an oxygen isotope ratio consistent with origins in the Outer Hebrides, although it can be seen in Figure 2.23 that there are other individuals excavated from the Hebrides, such as the Bronze Age individuals from Cladh Hallan (*e.g.* CH 2638) for which this is also true (Parker Pearson *et al.* 2005).

Considerable variability in oxygen isotope ratios is often seen in British populations and it is not yet established whether this variability is indicative of a highly mobile population, or of climate variation over the time that a cemetery was in use, or whether it merely reflects the extent of natural biological and seasonal variability within a single population.

Another factor that may alter the oxygen isotope ratio between different teeth is the additional fractionation effect that can occur if one tooth mineralized prior to weaning and a second after weaning: a baby fed on breastmilk will, in effect, be a trophic level above its mother and the phosphate oxygen isotope ratios in the tooth enamel would be higher in a tooth formed during breastfeeding. A difference ascribed to weaning of 0.7‰ was found by Wright and Schwarcz (1998). However, this mechanism cannot be used to explain the difference between the two teeth of KK because the first molar tooth, which would be the tooth to contain a pre-weaning oxygen isotope ratio, has a lower oxygen isotope ratio than the later-forming second molar. If the oxygen isotope ratio in this first molar was affected by breastfeeding, its 'true' value would be even lower than it is, and this would only enhance the existing difference between the two teeth and make an origin in the Hebrides even less likely. Even if all these factors are taken into account, it is extremely unlikely that the oxygen isotope ratio of the first molar would be consistent with origins on the western seaboard of Britain.

On the basis of the oxygen isotope variation in modern drinking waters in Britain and Ireland, the calibrated oxygen isotope ratio of -7.7‰ falls to the east of a line running from John O'Groats, southeast of Orkney, down the Great Glen to the Firth of Lorn around Oban, across to Glasgow and the River Clyde and thence to Carlisle and further south. An equivalent ratio is also found in northern Ireland. This suggests – if no differences in climate or rainfall patterns are assumed between the Pictish period and today – that the origins of the Pictish woman buried at Cille Pheadair lie in eastern mainland Scotland, Ireland or England.

Conclusions

The isotope analysis of the two teeth from the Cille Pheadair skeleton strongly suggest that this woman did not spend her early childhood – before the age of 8 years old – in the Outer Hebrides. Moreover, the lead, strontium and oxygen results from the first molar are different to those from the second molar and, together, they suggest a change of residence between the approximate ages of 4 and 6 years of age.

The very low level of lead in her teeth, as well as the non-ore lead isotope ratio, suggests a rural environment unpolluted by man-made products or food additives containing lead, such as water pipes, drinking vessels or cooking pots. The oxygen results point to early-life origins in eastern Scotland, Ireland or England and the marine strontium ratio of 0.7092 suggests that this could have been in a coastal region or further inland on silicate sedimentary rocks such as those of the Old Red Sandstone of Caithness, spreading east along the coast from Inverness and further south in the Midland Valley (Evans *et al.* 2010).

The oxygen and strontium in the woman's second molar suggest that, by the age of four, she was living away from the coast. Few rock types in Scotland provide the low strontium values (<0.7092) seen in her second molar. Ancient marine carbonate such as the Jurassic limestones of the Ardnamurchan peninsula in Argyll and the extensive Carboniferous limestones of Ireland, or areas of recent igneous rocks away from coastal influence, could supply such values. For example, the Iron Age woman excavated from the Durness limestone at High Pasture Cave on the Isle of Skye has almost identical oxygen and strontium values (see Figures 2.21–2.22).

2.8 Comparisons and discussion

M. Parker Pearson

The discovery of this burial in 1997 caused considerable public interest and the skeleton soon acquired the name of Cille Pheadair Cait (Kilpheder Kate). Local interest has followed the discoveries about her long-ago life not just during the excavation but over the many years of the scientific analyses presented above.

The presence in the grave of skeletons of a wood mouse and a similar small mammal (see Williams, section 2.4 above), recovered by flotation of the entire grave fill (904), provides interesting evidence for the possibility that the grave was accessible, if not open, for some months before the cairn was constructed over the top of it. Whether the rodents died in the grave or were deposited in it is not certain but, either way, the grave must have been accessible, and not covered by the cairn. It is possible that the grave fill (904) was not shovelled in but accumulated as a deposit of windblown sand. Such a process can happen very quickly in the machair environment, within days or even hours.

The manipulation of the disintegrating corpse's right arm and the removal of the sternum (and perhaps the coccyx) occurred before the sand entered the burial: perhaps the grave had been temporarily sealed (under planks perhaps, or under slabs removed and then replaced) until this interference, an event that could have been either sanctioned by ritual or a desecration of the corpse. Thereafter, the slabs (903) covering the grave were laid across it; sand subsequently blew into the grave through the gaps between the slabs. After some length of time after the interment of the corpse in the slab-built grave, perhaps many months later or a year or even longer, the cairn was finally constructed over the top of the grave.

This period of waiting between 'burial' and cairn-building is something that might have occurred more widely in northern Scotland and would explain, for example, the presence of a layer of clean sand between the extended inhumation and the overlying mound on certain Pictish cemetery sites in eastern Scotland (Ashmore 1980: 346). In this particular case, the Cille Pheadair burial was not separated from its cairn by such a layer except that the hitherto open grave appears to have been allowed to fill with clean sand.

Post-mortem disturbance

Despite the problems of understanding why there seems to have been little or no build-up of sand within the grave before the interference with the decaying corpse, the fact that access was gained to the body long after death and before construction of the cairn provides us with an unusual insight into the temporality of the funerary rites. Given the otherwise coherent state of the skeleton, it would seem that the corpse was placed in the grave at a point when it was still relatively undecayed. It must have spent a minimum of 3–4 months in the unfilled grave before it was disturbed. After the initial event of placing the corpse in the ground, this second act of bone manipulation and removal of the sternum was succeeded by a third act of cairn construction after the grave had entirely filled with sand.

These events and the necessary periods of time between them demonstrate that burial in this instance was a prolonged process in which the containment of the corpse and the filling-in of the grave might well have been in significant contrast to, for example, the rapid sequence of actions that characterizes contemporary burial practices in South Uist today.

Cultural modification of teeth?

Cille Pheadair Cait's lower central incisors were lost well before her death. She had also lost her upper left first molar and her upper right second premolar although there was no evidence for dental disease. The absence of the lower incisors may be explained as the result of avulsion – deliberate removal of central, symmetrical teeth for cosmetic or other cultural reasons – although these could have been lost through injury. It is difficult to be certain of this without a large sample of burials but this may be the first evidence for cultural modification of teeth in Pictish Scotland. Such practices are common in many parts of the world today but there are few well-documented archaeological examples (Jackson 1915; Milner and Larsen 1991; Robb 1997).

Pre-Viking terrestrial diets

Cille Pheadair Cait's ^{13}C isotopic value is consistent with a terrestrial diet. This fits well with all the values recently measured for South Uist individuals going back to the Middle Bronze Age (Mulville *et al*. 2009) and reinforces the picture of substantial dietary changes towards fish consumption in the Scottish islands occurring only at the beginning of the Viking period (Barrett *et al.* 2000: fig. 4). Despite increasing numbers of fish bones on Middle and Late Iron Age sites such as Dun Vulan and Bornais, there was no concomitant shift in ^{13}C levels in the human bones (Mulville *et al*. 2009).

Comparable square cairns

Funerary monuments from this period are rare in the Western Isles but are well known from eastern Scotland (Winlow 2011). Until 1998 there were no known Pictish Late Iron Age square-cairn burials from the Western Isles (Ashmore 1980; Close-Brooks 1984), but in that year, two other square cairns were discovered: in South Uist in South Glendale (Ceann a Deas Ghlinn Dail; Grahame 2012; Brennand *et al*. 1998: 40) and in North Uist at Aird Ma-Ruibne on the line of the Berneray causeway (Downes and Badcock 1998). Previously, two rectangular mounds had also been found on the small island of Sandray off Barra (Branigan and Foster 2000: 74).

- The first of the South Uist discoveries, a square cairn of similar dimensions to Cille Pheadair, was recorded by Rachel Grahame during field survey of the South Glendale peatlands on South Uist's south coast, next to a small circular cairn (Grahame 2012: 186).
- The second was found two months later by ARCUS (Archaeological Research Consultancy University of Sheffield) in North Uist, during topsoil stripping for the road to the new causeway linking Berneray and North Uist.

These are the first such discoveries in western Scotland, although long cists of the Middle Iron Age are known from these islands (Badcock and Downes 2002; Neighbour *et al.* 2002; Mulville *et al.* 2003). Finds of 'cists' – probably long cists – were recorded by RCAHMS (1928) in South Uist on the beach at Smercleit, east of Tipperton. There is no longer any trace of these graves and the cist slabs are apparently incorporated into the stone dyke that today takes fresh water to the sea at that location.

The Cille Pheadair square cairn is unlike the other four from the Uists and Barra and, in the absence of excavation, we cannot be sure whether these cruder monuments are of the same date. Square cists are known from eastern and northern Scotland. Cille Pheadair's closest comparisons are with square cairns at Sandwick, Unst (Bigelow 1984) and at Ackergill in Caithness (Edwards 1926; 1927; Close-Brooks 1984: 97–9, figs 5.5–5.6). Dates of square cairns elsewhere in Scotland hint that this tradition was later than the round cairn style (Greig *et al*. 2002: 609) and the late Cille Pheadair date (AD 640–780) certainly conforms to this.

The closest parallel is one of the two square cairns found immediately south of the Norse-period settlement at Unst on Shetland (Bigelow 1984). This cairn also contained the body of a woman aged about 40 and was constructed in an almost identical manner, with slabs covering the grave,

overlaid by a layer of slabs, overlaid by a layer of cobbles. The only difference in construction is that the Unst cairn incorporates small stone posts at the midpoints of its four sides, as well as having stone cornerposts. It is also much larger at 4.25 square metres. Bigelow does not record whether the body had been interfered with.

Six similar cairns, approximately square and between 3.8m and 2.1m across, were excavated at Ackergill in Caithness in 1925 and 1926 (Edwards 1926; 1927; Close-Brooks 1984: 97-9, figs. 5.5–5.6; Ashmore 1980: 348). The linear arrangement of the Ackergill cairns raises the possibility that the Cille Pheadair cairn was not alone but might have formed part of a larger cemetery, probably lost to the sea but possibly buried under the eroding sand cliff.

Sandwick is also interesting because of its juxtaposition of Pictish burial cairns with Norse settlement. A similar arrangement has been noted at Sangobeg, Durness in northwest Scotland, where a child's burial cairn lay beneath a Late Norse settlement, built about a thousand years later (Brady *et al*. 2008). As Brady *et al*. note, three such instances – Sandwick, Cille Pheadair and Sangobeg – hardly constitute a pattern but they hint at the possibility that Pictish burial sites might have served as visible markers employed in siting Norse-period farmhouses.

Pictish funerary practices in the Western Isles

An extended inhumation within a low square mound or cairn with corner posts is one of the classic forms of the pre-Viking Late Iron Age in northern Scotland (Ashmore 1980). Alongside symbol stones, these funerary constructions are one of the most recognizable monument types associated with Pictish culture. The Pictish kingdom is considered to have held sway in the northeast of Scotland, from the Forth in the south to Orkney and even Shetland, yet Pictish symbol stones survive on Skye and as single examples in the Western Isles on Pabbay (off Barra) and in North Uist (Armit 1996: fig. 9.1).

The discovery of Pictish cairns in three locations within the Uists and Barra reinforces the picture of Pictish influence in Skye and the Southern Isles of the Outer Hebrides. Whereas such monuments might have been considered by an earlier generation of archaeologists to represent the movement of groups into this area from northeastern Scotland, they might today be perceived as the expressions of political influence and affiliation between the two regions during the mid-first millennium AD.

The far-flung sharing of styles of funerary monuments between Caithness, Shetland and Uist also hints at the growing significance of long-distance seaborne networks and perhaps greater involvement in a growing world of 'strangers' in which individual identities were becoming more important as people travelled further afield (Sharples 2005b).

The strontium and oxygen isotope data reveal that the woman buried at Cille Pheadair was not a native-born Hebridean. She spent her very early years in eastern Scotland, Ireland or England, probably moving westwards in later childhood; her age when she arrived on South Uist cannot, sadly, be deduced from the isotopic analysis. The presence at Cille Pheadair of an individual who came from elsewhere to live (we can presume) and die on South Uist indicates very firmly the existence of links between the Western Isles and other areas to the east or north during the Late Iron Age.

Note

1 For the circumstances of the initial discovery, see Chapter 1.

3 Initial construction and occupation (phase 1) starting *cal AD 945–1020*

M. Parker Pearson and M. Brennand

with contributions by C. Ellis, J. Bond, C. Paterson, J. Mulville and C. Ingrem

3.1 Ploughing

M. Parker Pearson and M. Brennand

There was no trace of any activity underneath and predating the Pictish cairn but, further north up the beach, the Norse-period settlement was dug into and constructed upon a 2m-deep layer of windblown sand, just below the surface of which a series of ploughmarks were recognized in the north–south long section, facing onto the beach, that ran along the front of the sand cliff (Figure 3.1).

These ploughmarks indicate that the ploughing was done on an east–west axis and they lay within a 0.30m–0.50m deep layer of off-white yellow-tinted sand (621=446), which was sealed beneath the primary layers of occupation and itself lay on top of the undisturbed white machair sand.

The ploughmarks consisted of wedges of pure white sand, 0.10m–0.40m long and 0.04m–0.06m wide, tapered at each end and angled at about 45°–60°, within the windblown sand (621=446) below the Norse-period occupation surface. They were spaced about 0.20m–0.40m apart (an average width of 0.31m) and divided into two sets, north and south.

- The northern group comprised 24 identifiable wedges, almost all of them tilted down from the south to the north. The individual wedges were 0.20m to 0.40m apart, and the whole group spanned a minimum north–south length of 7.10m.
- The southern group comprised 16 identifiable wedges, each of which tilted down from the north to the south. In this group the individual wedges were 0.20m to 0.30m apart, and the whole group spanned a minimum north–south length of 6.00m.

The point at which the wedges changed angle was presumably the central axis of the ploughing strip, towards which sods have been tilted by the moldboard plough. We had hoped to be able to establish the full width of this strip (at least 13m wide) but unfortunately the ploughmarks were destroyed by the sunken floors of the Norse-period buildings in the centre of the site and did not extend into the northern part of the long section (Figures 3.2–3.3). To the south, beyond the margins of the settlement, the absence of any visible ploughmarks in the sand cliff suggested that they had been preserved only where they had been protected beneath the settlement's occupation deposits.

These 'wedges' probably derive from a surface layer of windblown sand that was sliced and subsequently trapped by the turning of the topsoil with a mouldboard plough. Their ephemeral forms may indicate that this part of the machair received just a single ploughing at some time before the farmstead's foundation. Yet it is curious that the sods or soil wedges drawn down into the ploughsoil were lighter in colour than the windblown sand layer in which they sat – one would expect darker, more organic material within the A horizon to have been drawn down – but perhaps the field's surface had recently been covered in a thin layer of windblown beach sand. In this case, then, we can interpret the ploughmarks in this sand layer (621=446) as a single episode of ploughing during which a surface accumulation of newly windblown sand was drawn down into the otherwise undisturbed darker sand beneath. Given that the soil micromorphology (see below) failed to identify any evidence for layer 621=446 being a ploughsoil, a one-off event seems the most likely interpretation.

Although ploughmarks were not visible in the northern stretch of this yellow-tinted plough horizon (621=446), this ploughsoil stretches for 30m north to south, before tapering out as an increasingly thin layer at either end. This distance might be interpreted, then, as the width of the field on which the settlement was subsequently founded. Above 621=446 there were a series of light brown and light grey sands, surviving to a depth of 0.40m to 0.60m, and containing occasional shell, bone and organic lenses.

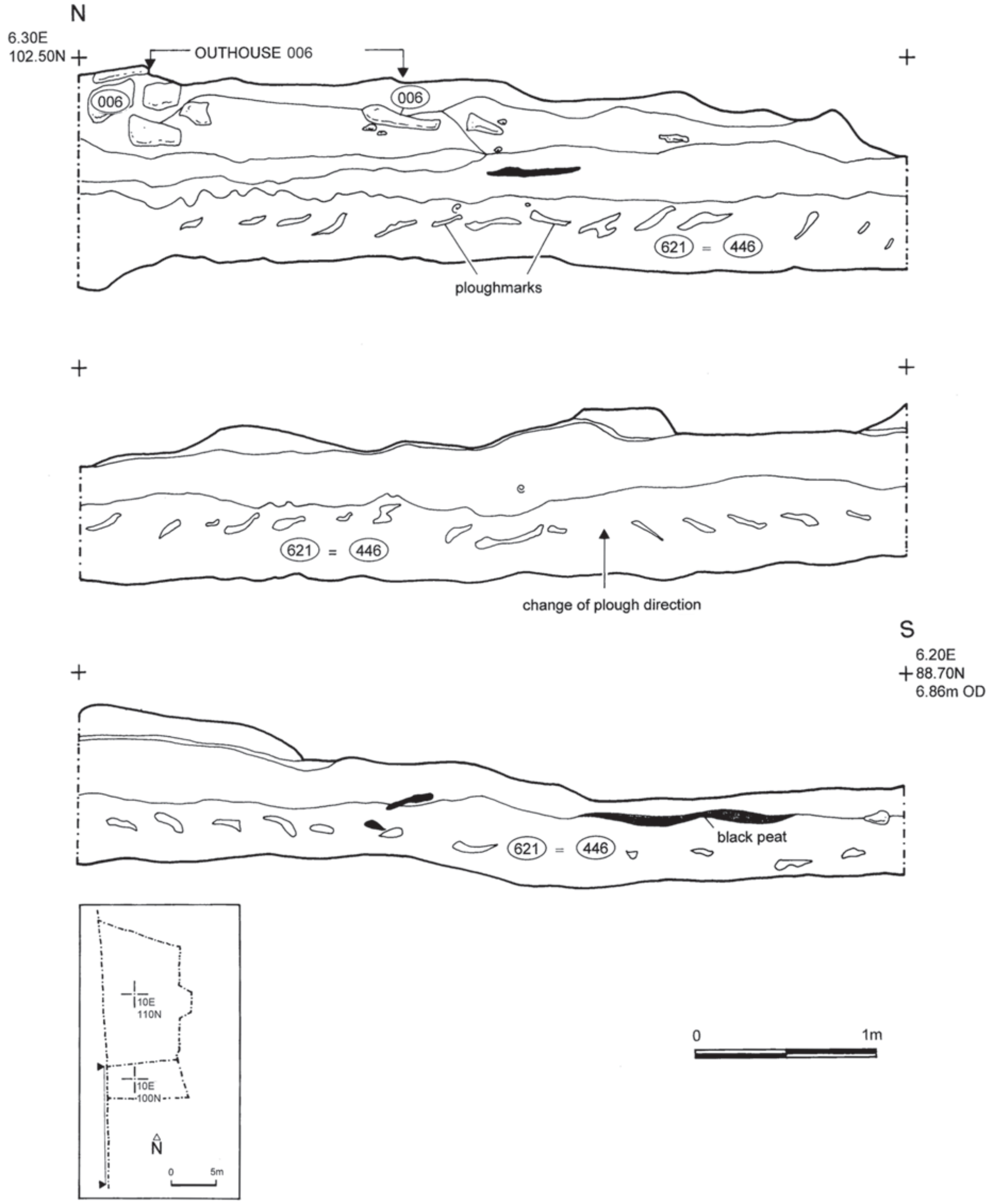


Figure 3.1. A detail of the long north–south section along the sand cliff, showing ploughmarks

These layers on the southern margin of the settlement petered out approximately 16.00m beyond the southern limit of the excavations, visible in the eroding sand face along the top of the beach.

The absence of a buried soil of any sort beyond either the north or the south margins of the farmstead's ground surface, as visible in the sand cliff section, suggests that there was very little, if any, humic content within the topsoil at the time of the farmstead's use.

3.2 The possible post-built structure

M. Parker Pearson and M. Brennand

The ploughmark layer was subsequently dug into to create a large, rectangular sunken area surrounded by a sandbank whose interior and exterior faces were revetted with stones (Figure 3.4). Within this sunken area – later to become the foundations of the sequence of stone longhouses – a mass of pits and postholes were dug (see Figure 3.8 for the plan of all the cut features).

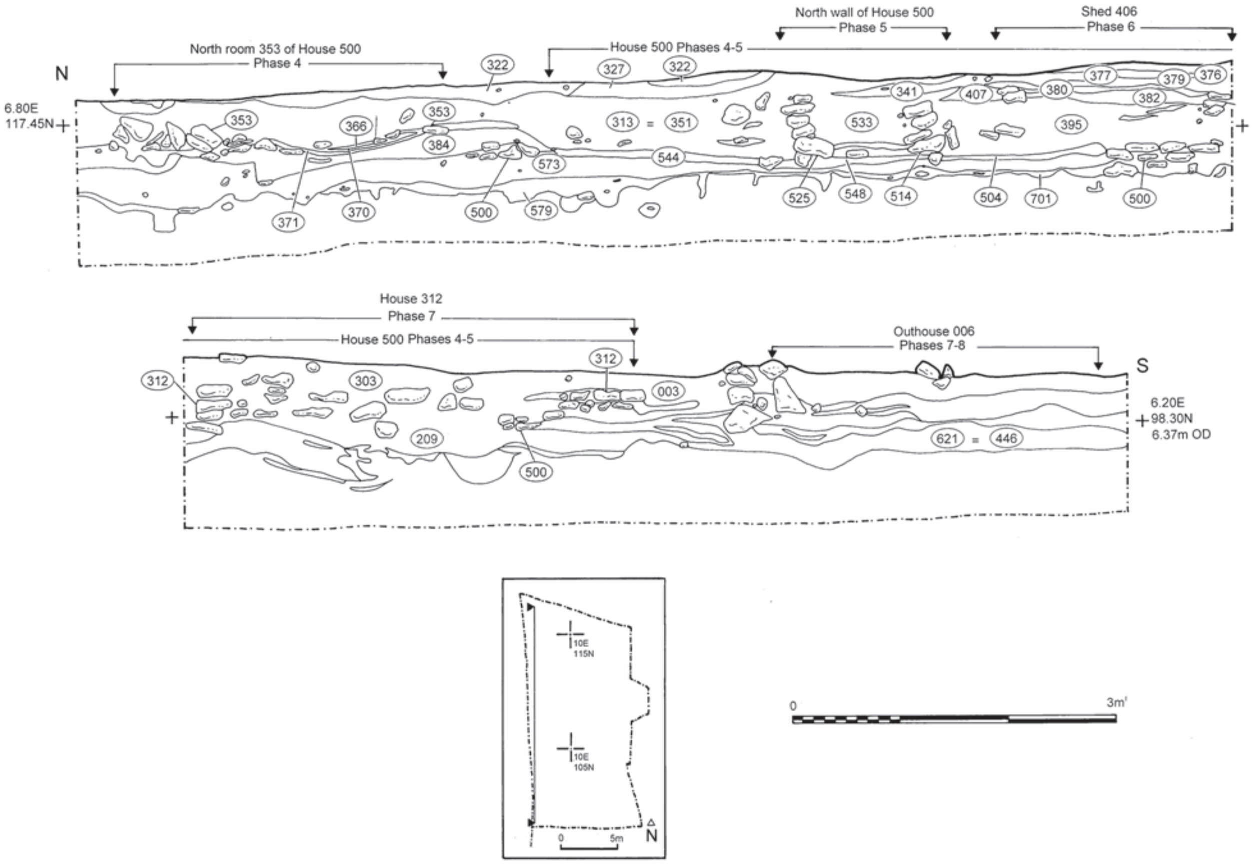


Figure 3.2. The long section, north–south, along the sand cliff

Figure 3.3. View of the sand cliff section from the northwest

Whereas the pits appeared to have been cut from this lower, sunken level, the postholes were all shallow and truncated. This suggests that the postholes might have belonged to an early timber building that was erected after the ploughing but before the construction of the sandbank. This interpretation cannot be confirmed with absolute certainty and there is still the possibility that the postholes post-date the sandbank.

Two parallel lines of postholes, running north–south, were identifiable in the northern part of the site. The western line consisted of 646, 638, 633, 642, 593 and 585 (Figures 3.4 [left], 3.8). The eastern line consisted of 627,

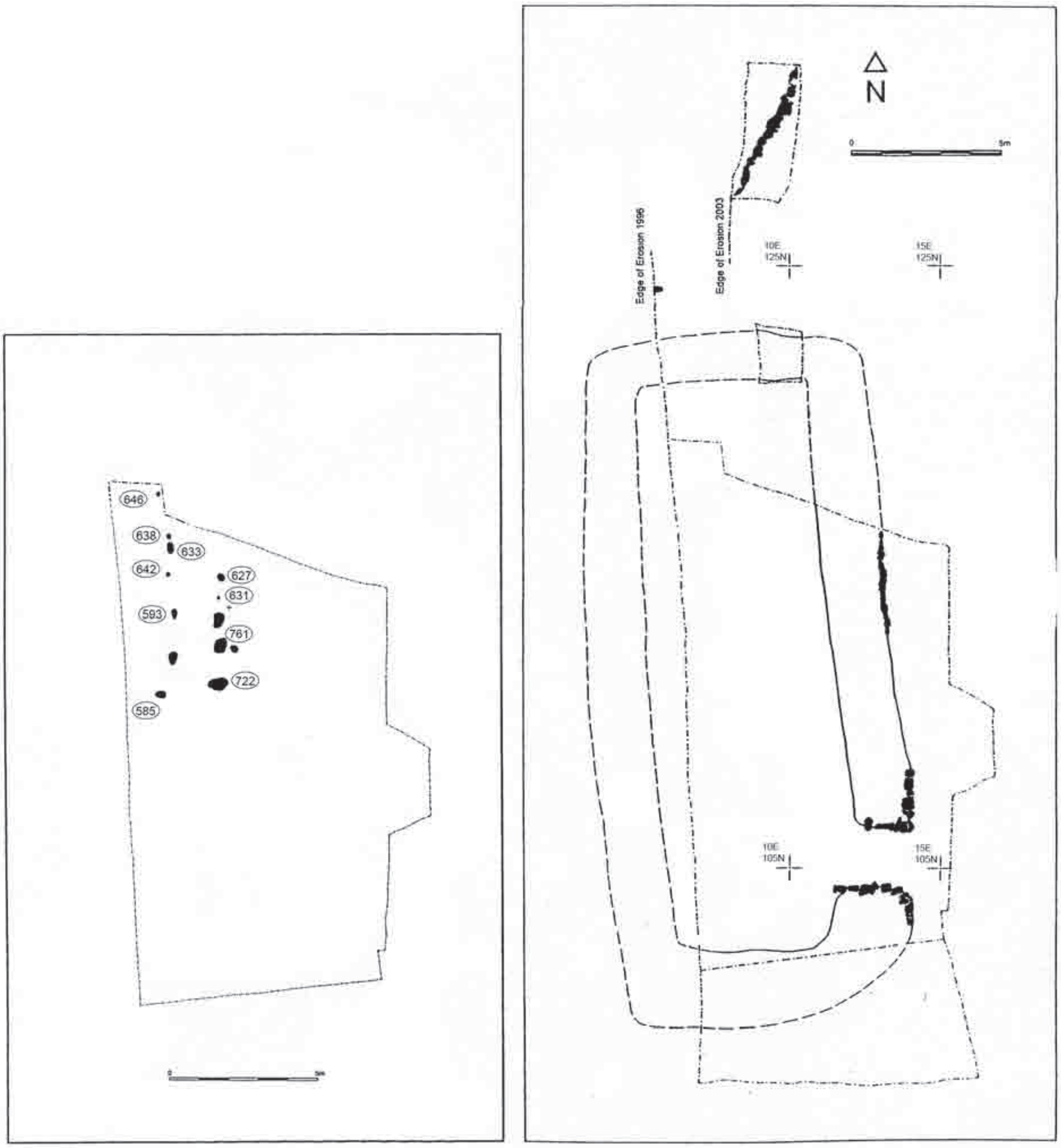


Figure 3.4. Plan of the sandbank enclosure and of the area within the sandbank enclosure showing the postholes

631, an unnumbered posthole within pit 739, 761 and 722 (the latter two possibly framing an east-facing doorway). There was no consistency in their shapes, depths or fills and the two lines were not particularly straight (dimensions and fills of these postholes are described below in Section 3.4 and illustrated in Figures 3.8–3.12, alongside other cut features of phase 1).

Measuring between the centres of the postholes, each was between 0.70m and 1.40m from its neighbours and the two possible rows could have formed a small structure measuring just *c.* 1.80m east–west and *c.* 7.30m north–south. The eastern row was constructed 1m west of the inner face of the sandbank enclosure. The most northerly posthole (646) was about 2.50m from the north wall of the sandbank enclosure whilst the most southerly (585) was about 9m from the enclosure's south wall.

The possible doorway (two large and solidly stone-packed postholes; 722 and 761, 0.80m apart) lay towards the southern end of the possible wooden structure's eastern post row. A further posthole (708), directly east of the possible door posthole 761, was a round, shallow pit or posthole that could have held a post for a porch structure.

In 2003 a small trench was dug through the northern circuit of the sandbank enclosure wall (see next section) to confirm that the possible post-built structure did not extend this far north. Although a small void (786) was encountered on the ground surface at the base of the bank (Figure 3.5), there was no sign of any postholes forming a house wall.

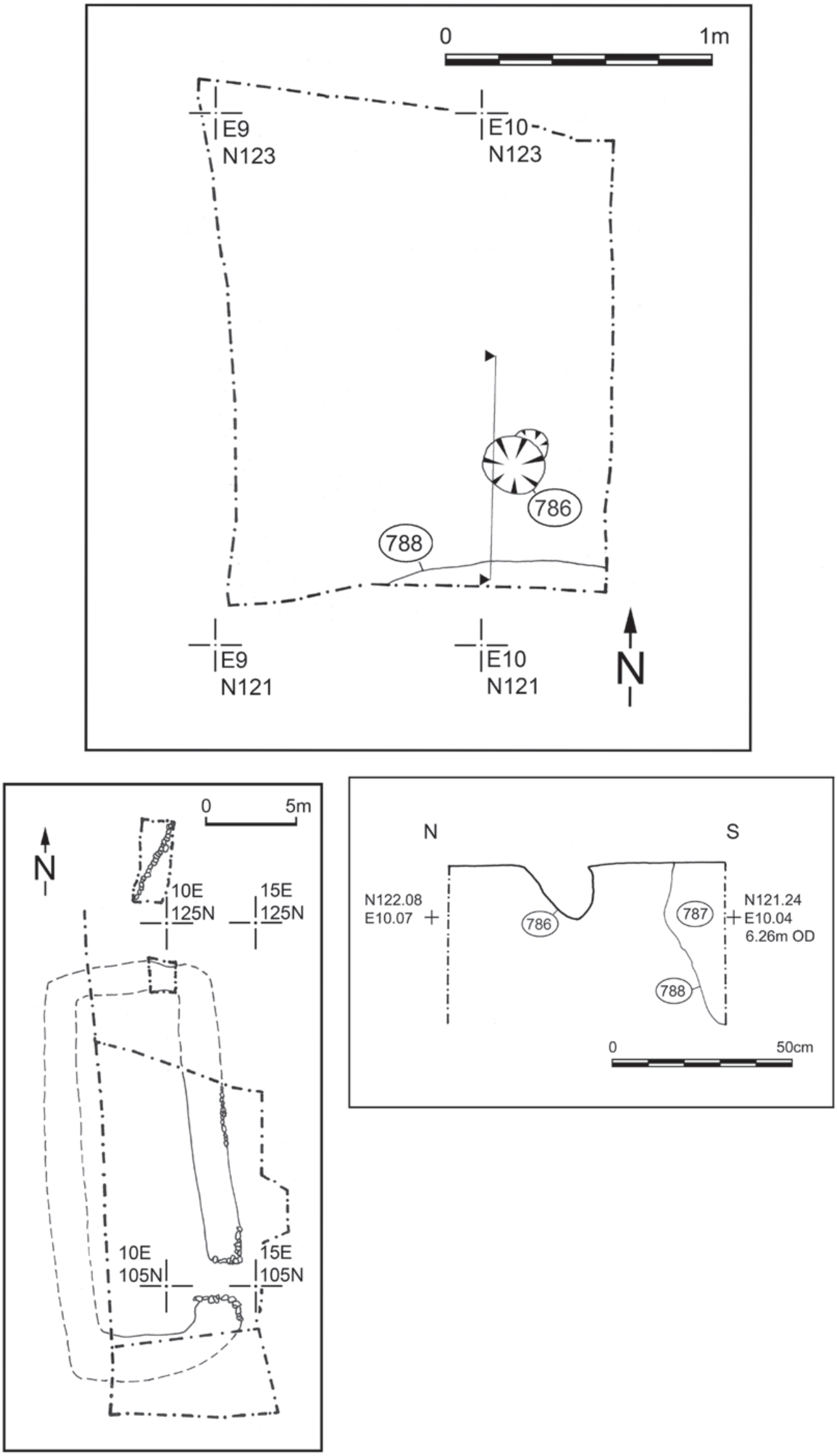


Figure 3.5. Plan and section of a void (786) sealed beneath the sandbank enclosure (and a phase 4 pit [788] cutting the north wall of the sandbank enclosure)

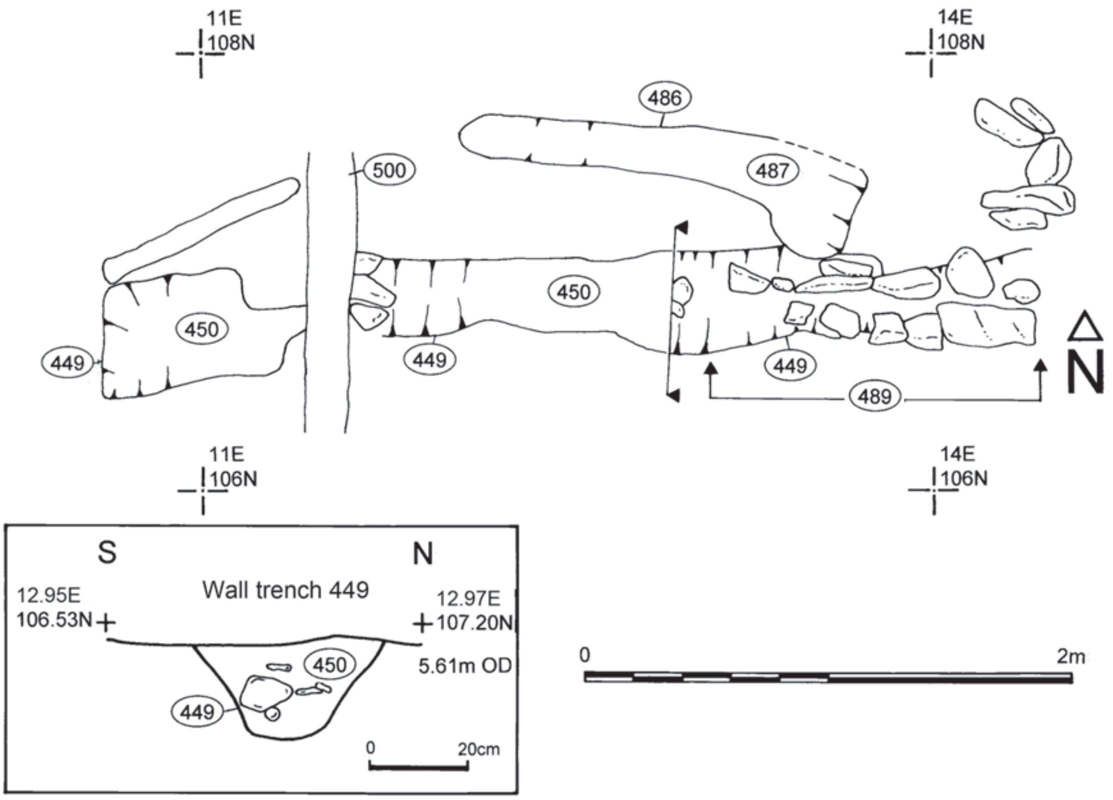


Figure 3.6. Gully 486 and wall trench 449 at the entrance to the sandbank enclosure

The post-built structure suggested by these features would have been extremely narrow. If the western row were originally the central line of a two-aisled, three-post-row building, however, then the dimensions of such a building would have been between 5.40m and 8m north–south and *c.* 3.60m east–west, potentially close to the size of some of the later stone-walled longhouses at Cille Pheadair. This would place the hypothetical west wall of the structure about 0.60m beyond the surviving western edge of the site (*i.e.* washed away by the sea before the excavation began), originally either hard against the western stretch of the enclosing sandwall or actually dug into its side.

Longhouses of this period are generally three-aisled (with four post-rows) in form; if this were the case at Cille Pheadair then the putative house would have been about 5m wide but less than 8m long. Of course, any evidence of one or more hypothetical western post rows was already lost to the sea by the start of excavations.

Just possibly the postholes are remains of a small timber building, the first construction on the site, in existence prior to the creation of the sandbank enclosure and the digging of the large pits. Thus the digging-out of sand from within the enclosure to form the encircling sandbank would have truncated those postholes that we encountered.

Finally, a number of postholes identified beneath House 700 in the southern end of the enclosure (727, 731, 740 and possibly 729) do not form any pattern either amongst themselves or in relation to the postholes in the northern part of the enclosure (Figure 3.8).

3.3 The sandbank and its stone revetment walls

M. Parker Pearson and M. Brennand

Above the ploughed horizon (621=446), and subsequent to the post-built structure, the next activity on the site was the construction of a rectangular sand-banked enclosure, 24m–25m north–south by *c.* 8m–10m east–west. This enclosure was placed within the former ploughed area, not centrally but on top of the northern two-thirds of the cultivated strip.

The surviving bank of this enclosure ran in a north–south direction down the eastern side of the excavated area (Figure 1.12) and was visible in profile in the face of the sand cliff to the north and to the south of the site, running east–west. Sea erosion had entirely destroyed the sandbank's western circuit before excavation began.

The first act of constructing this enclosed and sunken area was the digging out of an extensive, flat-bottomed hollow (483), about 17m north–south, 5m east–west and up to 0.50m deep. This rectangular hollow would subsequently contain the floor and foundations of a small longhouse (House 700; Chapter 5).

Sand excavated from this hollow was mounded up to form the surrounding sandbank (482=150), standing to a minimum height of 0.60m above the ground surface and with a width from 1.50m to 2.00m. Material from the area outside the embanked area might also have been removed and mounded onto the bank, but there was no indication of a surrounding ditch associated with the bank.

The surviving eastern sandbank was revetted on its external side by a drystone wall of randomly coursed, unworked beach cobbles (337), surviving up to four courses in height (Figure 3.7). Revetment wall 337 was repaired (after the accumulation of layers 339, 338, 334 and 332 behind it [to its west] in phase 2) and later replaced and hidden behind a second wall of randomly coursed, unworked beach cobbles (326; phase 2) surviving to a height of three to four courses (see Figure 3.14).

The internal face of the bank was also revetted with a similar stone wall (342; see Figure 4.3), but the construction of subsequent buildings removed most of these stones. The internal stone revetment was only visible in the sand cliff section to the north of the site, where it survived to three courses in height, and on the northern part of the eastern bank where a couple of stones remained *in situ*.

Within the centre of the eastern sand wall, the white sand bank (482) sealed an isolated deposit of lensed mid to dark brown organic sand (485), with bone and shell inclusions. There was a similar, but smaller, lens of material sandwiched within the bank material itself. The southern part of the eastern sandbank (150) was truncated by the entrance to House 700 and subsequently House 500's entrance and south end.[1] The bank was recorded in profile in the sand cliff section at its south end (Figure 1.13), where it was heavily disturbed by the construction of a subsequent building (House 006; see Chapter 10).

A series of sand layers (150=321=482) accumulated in phase 1 to form the sandbank. In the sandbank's northeast corner, 321 was overlain by other clean sand layers 323 and 444 (shown in Figure 3.13). These and 150=321=482 were earlier than the stone revetment walls 337 (east side) and 342 (west side) that were set into the sides of the sandbank.

The enclosure was built prior to the digging of a series of pits and postholes within its interior (Figure 3.8). There is no stratigraphic relationship between these two sets of events but we assume that the sand-banked enclosure was constructed prior to the pit-digging activities because these pits were restricted to the interior of the enclosure (although there is reason to suppose that a post-built structure, perhaps a timber house, was erected prior to the enclosure and the pit-digging; see above for discussion of these earlier post-holes).

Furthermore, the construction of the sandbank was effected by digging out the area enclosed by it to a depth of 0.50m. Had the pits already been dug and filled before the sandbank's construction, then they would have shown evidence for truncation (as is evident for the postholes belonging to the possible post-built structure that preceded the sandbank) and their darker fills would have been incorporated into the otherwise clean white machair sand of the sandbank, thereby discolouring it.

The entrance into the sandbank enclosure

On the enclosure's eastern side, just off-centre to the south, was a 2.50m-wide break in the sandbank, presumably to allow access into the embanked area. The northern terminal to this entranceway was revetted by a stone wall (476; Figure 3.8). The southern terminus was revetted by the southern wall of the entrance passage to House 700 (see Figure 4.1). (Alternatively, the construction of the house's entrance passage might have cut away the original southern terminus of the entrance through the sandbank; were this the case then the original width of the entranceway would have been less than 2.50m.)

Although the southern half of the entranceway had been destroyed by the insertion of House 500's entrance passage (see Chapter 6), several features were preserved in its northern half. Among the earliest of these were two shallow, curvilinear gullies (486 and 490) cutting the stone revetment wall trench 449. Gully 486 contained a grey sand fill (487) that had formerly held stones (Figure 3.6). Gully 490 curved from the west to cut 449 on its north side, and contained brown-black sand (491). The stone wall (476) revetting the northern terminal was replaced by a second, straighter stone wall trench (449), filled with stones and dark brown sand (450, itself containing a small area of paving [488]). Finally, this wall was taken down and the new northern terminus was cut back 0.50m into the sandbank and revetted by the building of a third wall (bonded into the second outer revetment wall 326 [phase 2] that replaced wall 337).

It is not clear why the northern terminus of the sandbank entrance was remodelled unless it had proved to be unstable. Widening by an extra half-metre might conceivably have allowed easier access into the sandbank enclosure in order to build House 700.

The entranceway was subsequently filled in during phase 3 with a mottled sand deposit (528). This deposit filled in the entrance through the sandbank wall, from the northern terminal's revetment wall (476) to the northern wall of House 700's entrance passage.

Summary

The sandbank enclosed an area that was to be the focus of activity and the centre of the farmstead for the following century (phases 3–6). Thereafter its eastern stretch was built over (House 312 in phase 7; see Chapter 9), and the final longhouse (House 007; see Chapter 10) extended beyond the eastern edge of the sandbank wall. There was no evidence for any wooden element or palisade within, below or on top of the bank and it is unlikely to have been a defensive structure. Nor was the function of the sandbank merely to provide revetment for the sunken lower courses of the house walls, as the first house (House 700) is positioned well within the embanked enclosure and only the eastern wall of the house is revetted into the bank.

The bank was essentially made up of windblown sand. We doubt that any dark, organic topsoil or turf existed on what was a ploughed field on the machair at the moment of construction; there is no evidence of a humic ground surface above the ploughmarks (see above). The fact that the bank was revetted with stone on its internal and external faces indicates that it was intended to remain

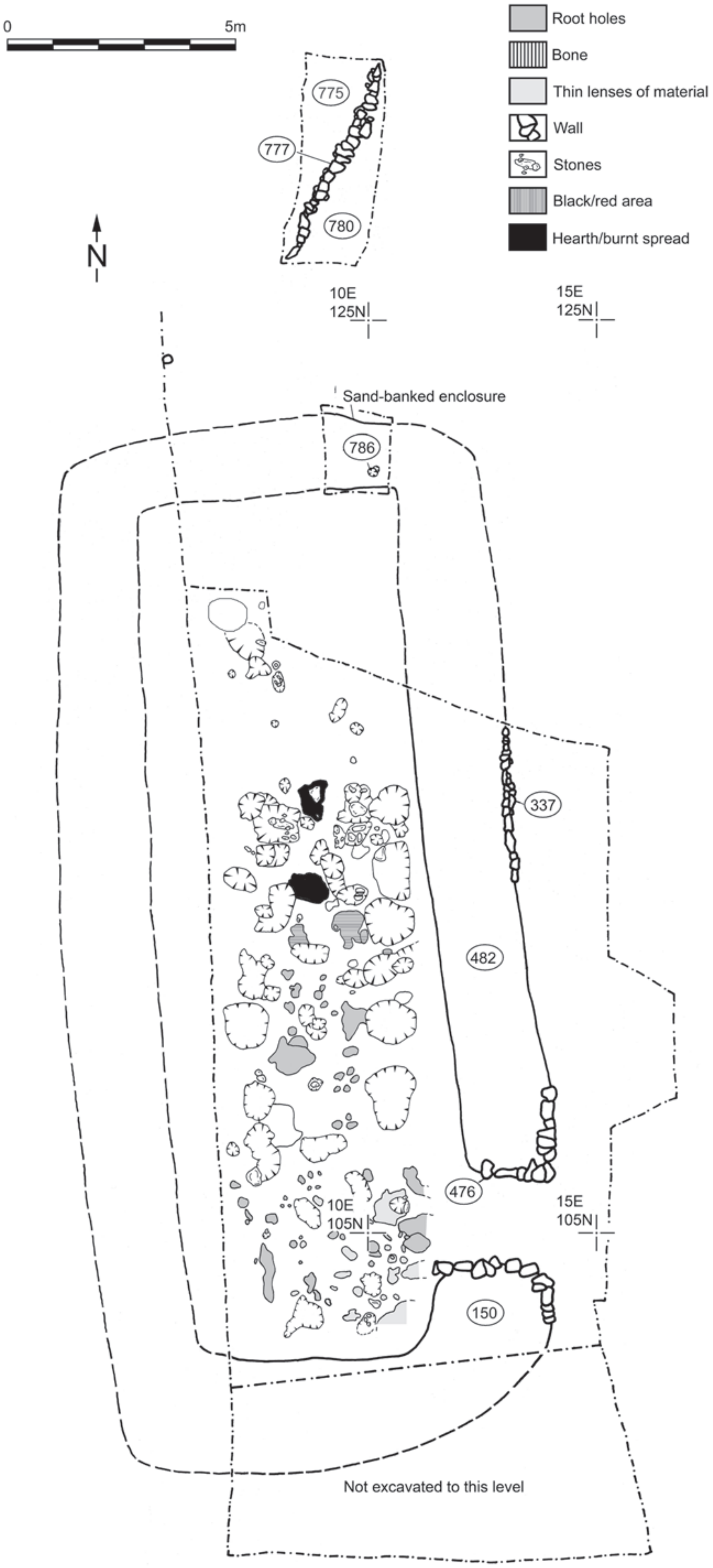


Figure 3.7. Plan of the area within the sandbank enclosure (omitting pit 604)

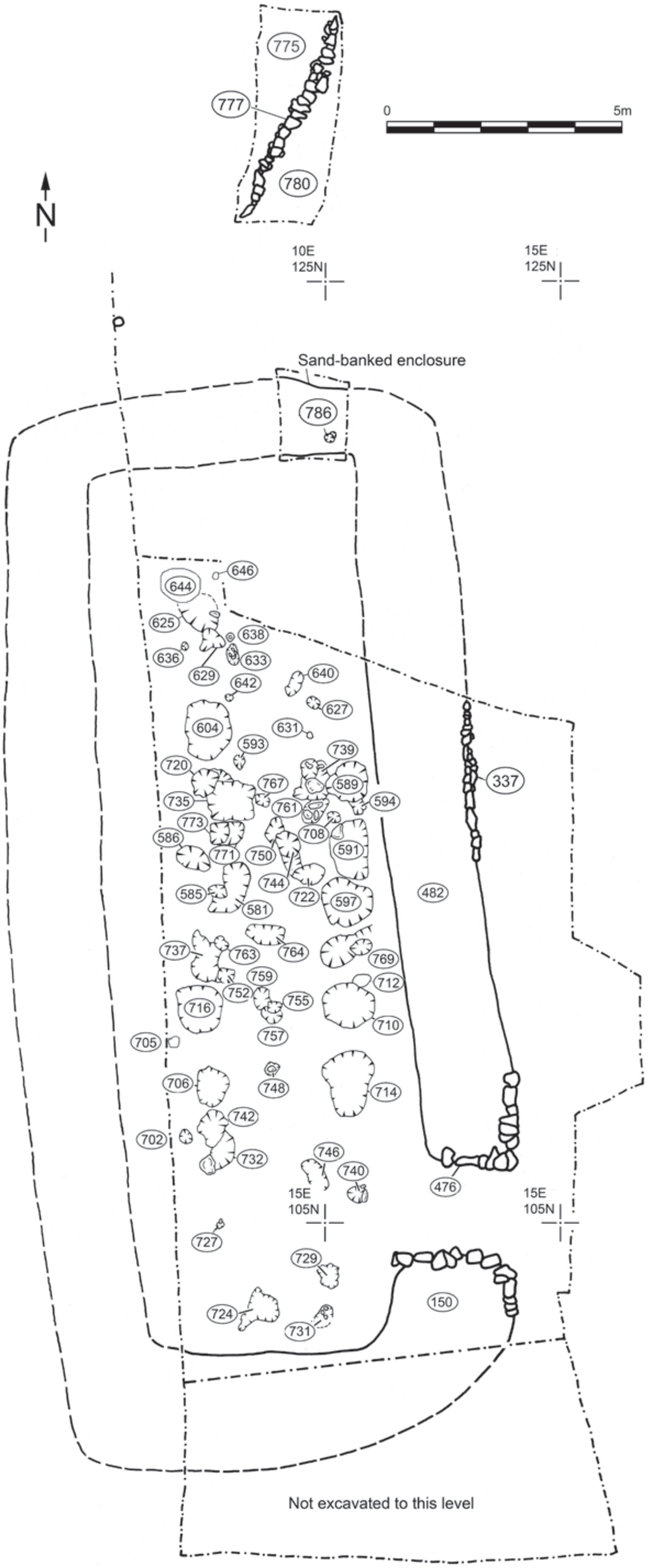


Figure 3.8. Plan of the area within the sandbank enclosure (with context numbers)

standing, demarcating the internal area of pit-digging and of subsequent construction and occupation of the farmstead.

3.4 The pits within the embanked enclosure

M. Parker Pearson and M. Brennand

The earliest activity within the embanked area was a densely distributed series of pits and scrapes (and possibly postholes; Figures 3.7– 3.9), cut into the clean white sand of the hollow (483). The pits were certainly backfilled soon after they were dug out, since their steep profiles remained intact and their fills were generally clean and homogeneous (Figures 3.10–3.12). Had the pits been left open and unfilled for any length of time, then their vertical sides cut into the soft machair sand would have collapsed.

The larger pits formed two north–south rows, dug close to the inner edges of the sandbank enclosure. One can speculate as to whether they were dug with the intention of holding posts for a wooden longhouse or other structure, although they contained neither packing stones nor any sign of having held posts or having had them removed. We could postulate a situation in which two lines of postholes were entirely removed by digging these pits around them but this seems an unnecessarily complex explanation of these features. They post-date the sandbank enclosure (Section 3.3 above) and may well be later than the two lines of small potentially truncated postholes (described in Section 3.2 above) which could pre-date the sandbank enclosure.

The western pit alignment

The largest pits were positioned in two approximately north–south lines, with smaller pits, holes and postholes around them (Figure 3.8). The westernmost alignment consisted of nine large pits (644, 625, 604, 735, 581, 737, 716, 706 and 732) and a number of smaller pits.

- The most northerly pit in the group was a rounded, shallow-sided feature (644), 0.50m deep and with a maximum diameter of 0.85m. The pit was filled by a light brown sand (643).
- To its immediate south, this pit cut through an earlier, rounded, shallow-sided pit (625), with a depth of 0.39m and a maximum diameter of 0.56m. The pit was filled by a grey sand (624), with charcoal and bone inclusions.
- To the south, the next pit was a round, steep-sided feature (604), approximately 1.00m in diameter and 0.70m deep (Figure 3.13), filled with a homogeneous grey brown sand (608) that contained numerous bone, antler and iron artefacts (see Table 3.1). A Hiberno-Norse copper-alloy stick pin (Table 3.1), dated elsewhere to no earlier than the start of the twelfth century (see Chapter 13), was found above this layer in pit fill 605. Above 605 was layer 602, a brown sand filling the top of pit 604, containing a comb fragment.

Pit 604, its fills (608, 603=605 and 602) and surrounding layers (606 and 607) have been placed in phase 1 with the other large pits but there are alternative interpretations of its position within the sequence. A test trench (dug at the end of the 1997 season to investigate the site's basal layers in advance of the 1998 season) fortuitously isolated this large pit from the surrounding sequence (see Figure 4.1). Given the typological dating of the stick pin, pit 604 could have been cut from a higher layer and thus belong to phase 2, 3 or even 4. The radiocarbon date from conjoining cow phalanges in a surrounding layer (607, pre-dating pit fill 605) is also late (cal AD 1020–1220 at 95% probability [SUERC-4873; 910±40 BP]). Carbonized residue from pottery within layer 602 produced a radiocarbon date of cal AD 890–1030 at 95% probability (SUERC-4889; 1060±40 BP). However, the possibility cannot be ruled out that this sherd was residual, and this latter date does not incontrovertibly date the pit fill. Pit 604 has been assigned to phase 1 for the purposes of analysis of the various assemblages.

Figure 3.9. Excavation of the pits within the sandbank enclosure, viewed from the north

Table 3.1. Phase 1 non-ceramic artefacts by context and context type

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 1				
WESTERN PIT ALIGNMENT				
Pit 625	624	see Chap 15	iron rove	
Pit 604	608	1854–1859	near complete single-sided composite comb missing nearly all its teeth	13.1
		1839	bone toggle	
		1860	bone point	
		1861	bone cut cylinder	
		see Chap 15	iron strip fragments, a tool, nails, roves, a fitting	
	603=605	1868	round-headed copper-alloy stick pin	13.15
		1869	fragment of a single-sided composite comb	13.1
		see Chap 15	iron rove	
	602	2683	fragment of a single-sided composite comb	13.1
Layers cut by Pit 604	607	2172	comb toothplate	13.1
		2805	bone point fragment	
		see Chap 15	probable iron cauldron fitting, probable knife tip, nails, roves	
		2174	transversely flattened-headed bone pin, broken in two	13.10
Pit 581	580	2116	bone skewer pin	13.10
		2204	bone spindle whorl	14.1
		see Chap 15	riveted iron strip	
Pit/posthole 763	762	2169	bone awl	14.2
		2170	bone pin fragment	13.10
		2182	small partially drilled hone	
Pit 716	717	2161	perforated antler peg	14.1
		see Chap 15	possible iron tool	
Pit 586	587	2153	rim fragment of steatite vessel	16.4
Pit 706	707	see Chap 15	iron rove, nail	
Pit 732	733	see Chap 15	iron nail	
EASTERN PIT ALIGNMENT				
Pit 589	588	2158	perforated pig fibula pin fragment that conjoins SF 2184	13.10
		see Chap 15	iron rove, nail	
Pit 591	590	2331	copper-alloy tag or strap-end	13.15
		2157	half-moon cetacean bone scraping tool	14.6
		2184	bone pin fragment that conjoins SF 2158	13.10
Pit 597	596	see Chap 15	iron cauldron lug, riveted fitting, nails, unident. fragments	
Pit 710	711	2155	bun-headed bone pin	13.10
		2164	broken club-headed bone pin	13.10
		see Chap 15	iron nail	
Pit 714	715	2159	nail-headed bone pin	13.10
		see Chap 15	riveted iron fitting	

Table 3.1. continued

PITS AND POSTHOLES TO THE NORTH				
P/hole 627	626	see Chap 15	iron nail	
P/hole 761	760	2171	whale bone clamp fragment	14.6
P/hole 708	709	2156	fragment of copper-alloy artefact	13.15, 13.19
		2179	piece of worked slate	
Pit 722	723	2162	comb toothplate	13.1
		2167	perforated antler peg	14.1
		2163	perforated cetacean vertebral epiphysis (pot-lid)	14.9
Pit 750	751	see Chap 15	iron rove	
Pit 771	770	see Chap 15	iron nail	
SANDBANK				
	321	see Chap 15	iron needle, roves, nails	
	323	1815	comb tooth-plate	
		1816	cross-shaped lead artefact	13.15
		2030	worked antler tine	14.4
		1148	possible stone artefact	
		see Chap 15	iron nails, rove, mount or fitting, unident. fragments	
	444	see Chap 15	iron nails	
PLOUGHSOIL				
	621	see Chap 15	iron rod (?tooth of comb or heckle)	
STONE REVETMENT WALL				
	342	see Chap 15	iron nail	

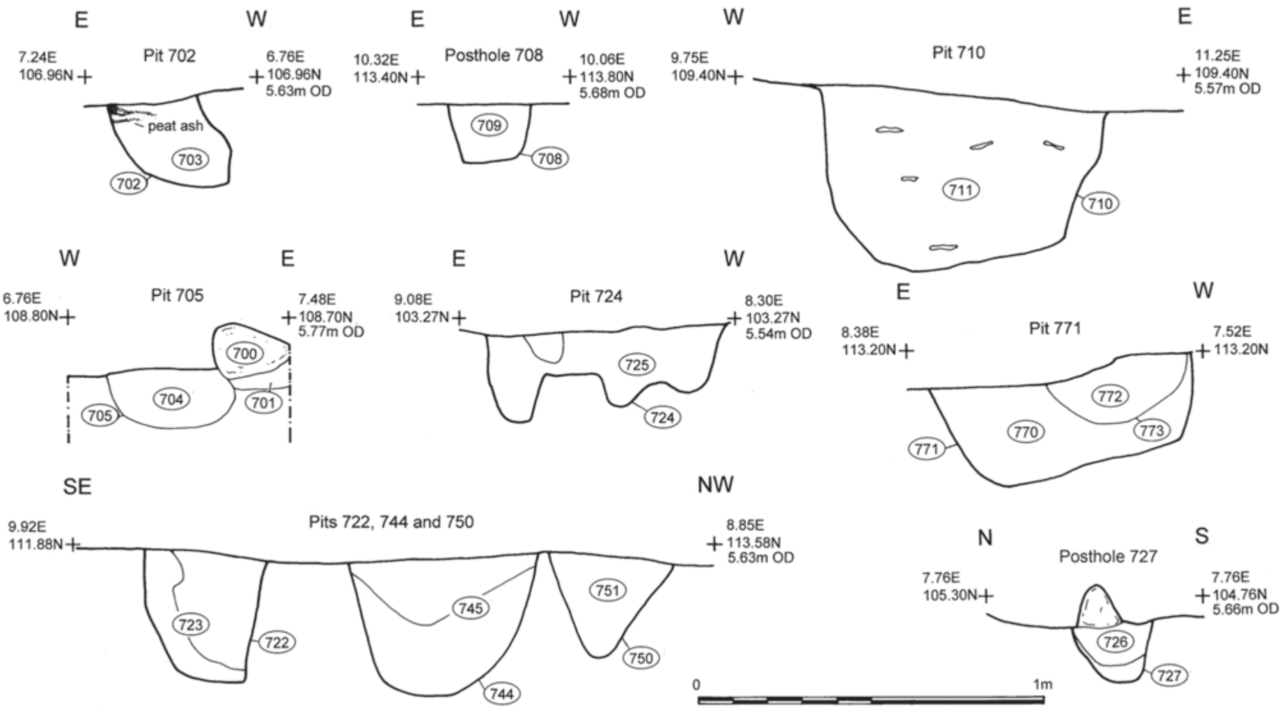


Figure 3.10. Sections of pits and postholes within the sandbank enclosure

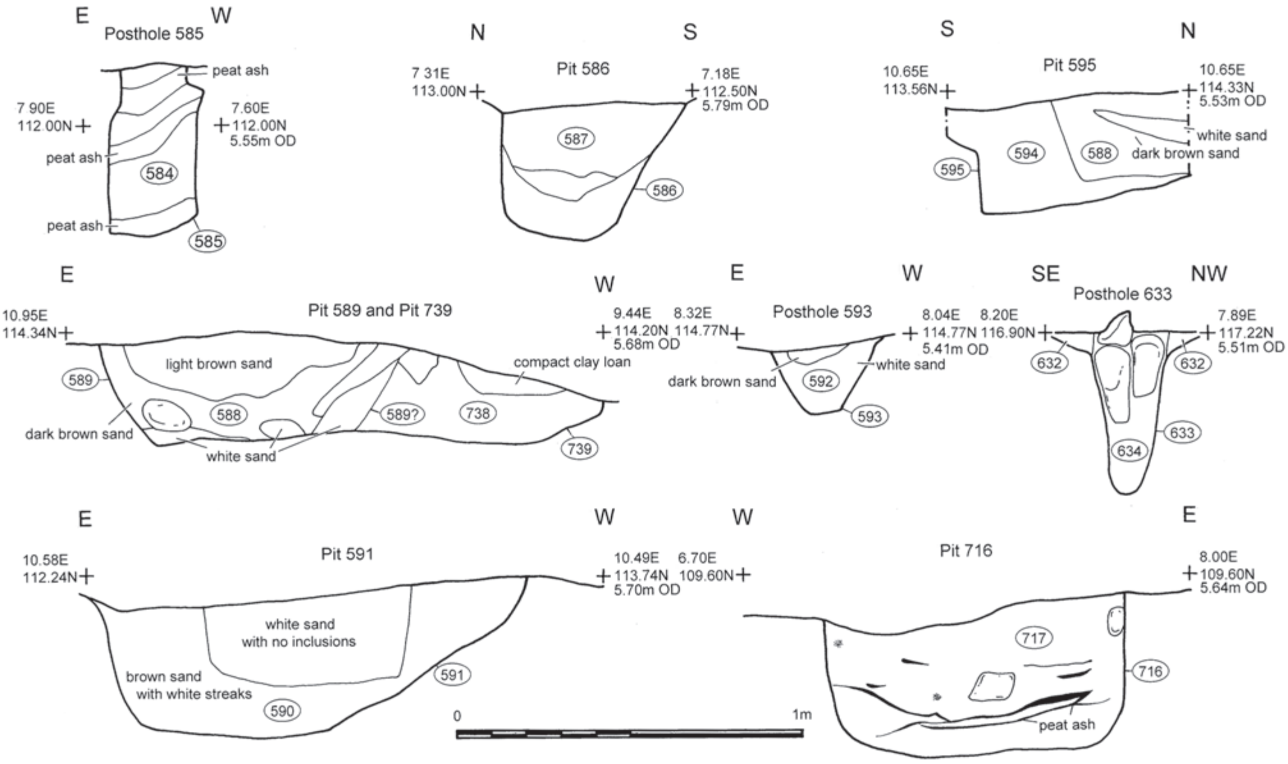


Figure 3.11. Sections of pits and postholes within the sandbank enclosure

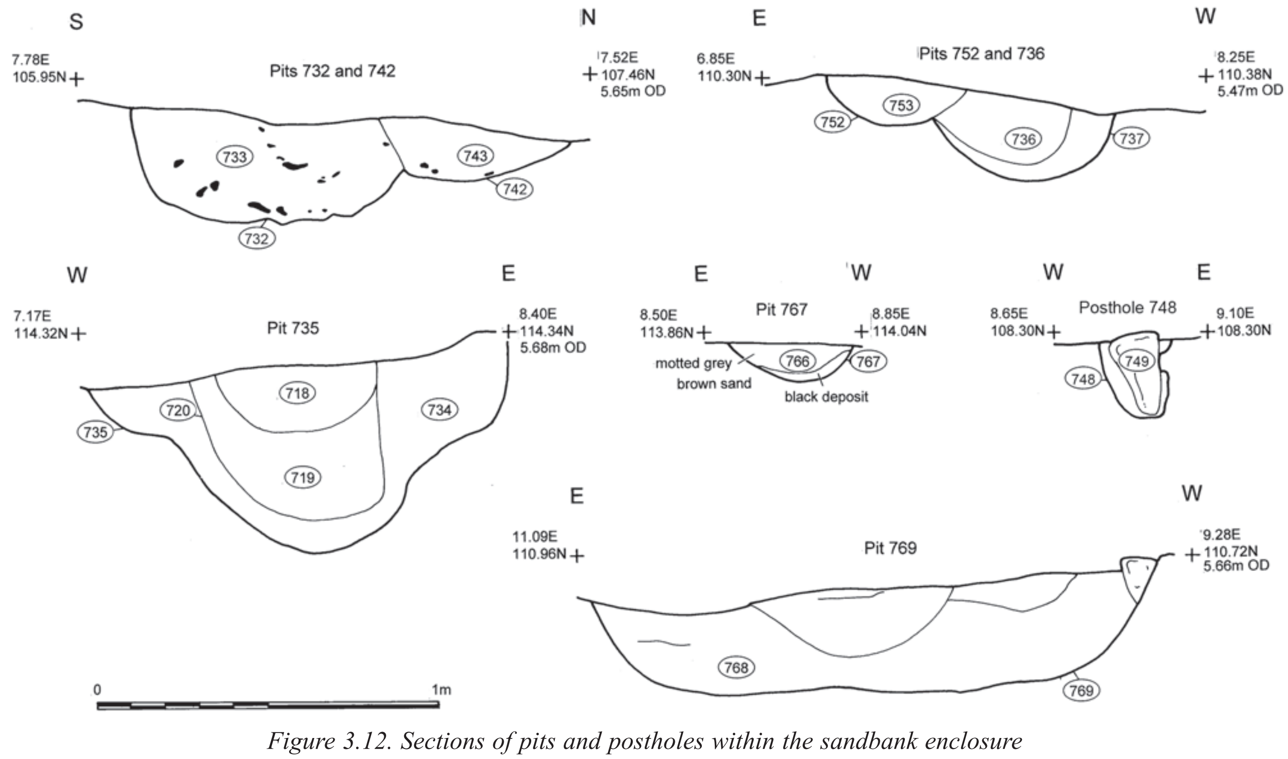


Figure 3.12. Sections of pits and postholes within the sandbank enclosure

- Pit 735 was a large, irregular pit 1.25m across and up to 0.55m deep, filled with light grey-yellow sand (734). This pit was cut by a smaller pit (720) filled by 719 and 718.
- Pit 581 was an irregular pit, 1.20m long, 0.46m wide and up to 0.31m deep, filled with black hearth material (580) containing bone and iron artefacts (Table 3.1) and much pottery.
- To the south of these features was an irregularly-shaped pit (737), with a depth of 0.25m and a north–south

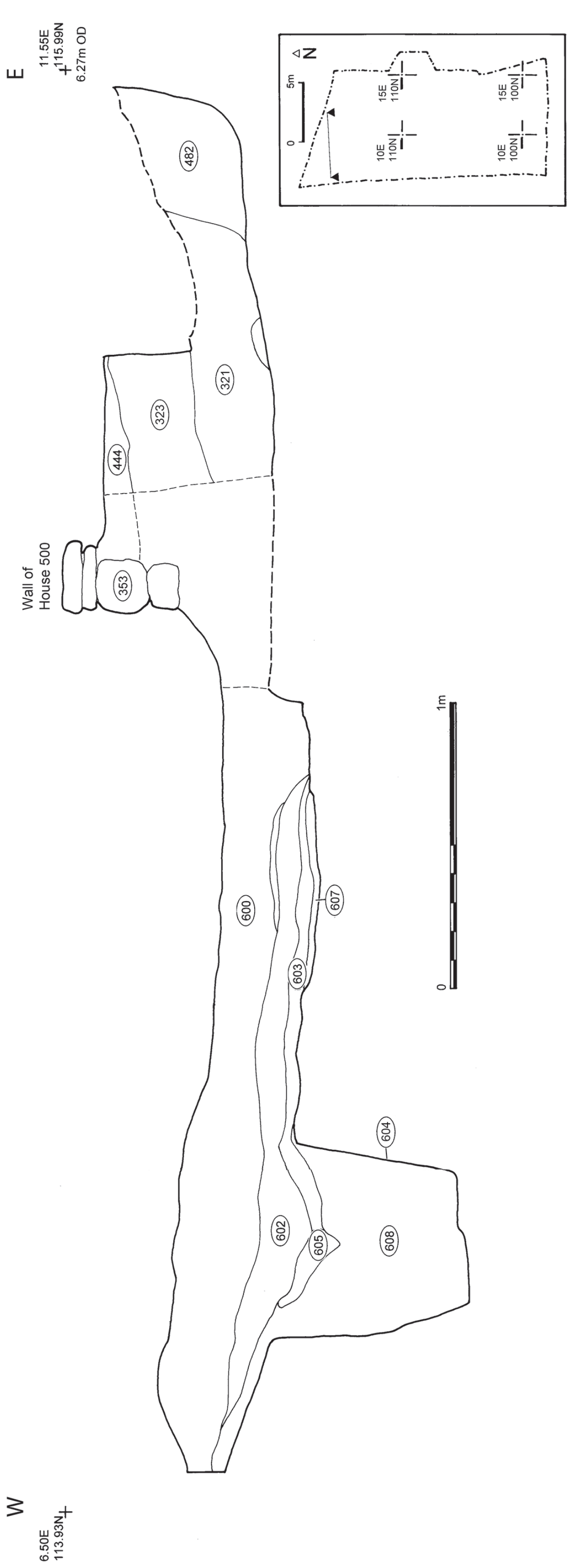


Figure 3.13. East–west section through pit 604, showing its relationship to later layers

length of 0.90m. Feature 737 was filled with a light brown sand (736) with animal bone inclusions. Cutting it was a posthole (763) whose light yellow/grey fill (762) produced bone and stone artefacts (Table 3.1). Pit 737 was truncated by a rounded, shallow feature (752), with a depth of 0.13m and a diameter of 0.35m. The feature was filled with a light brown sand (753).

- Continuing to the south, the next pit was round, vertically-sided and flat-based (716), with a depth of 0.42m and a maximum diameter of 1.00m. This pit was filled by a light grey-brown sand (717) with lenses of dark brown organic sand and produced an antler peg (Table 3.1), animal bones, charcoal and small stones.
- The next pit (706) was round and vertically-sided with a flat base, a depth of 0.38m and a maximum diameter of 0.84m. It was filled with a light brown friable sand (707) with animal bone inclusions.
- The last pit, the most southerly within the group, was an irregular-shaped, steep-sided feature (732), with a depth of 0.30m and a minimum north–south length of 0.88m. This pit was filled by a relatively clean, light brown sand (733) with lenses of dark organic sand and shell and bone inclusions. To the north the pit and its fill were truncated by a shallow, rounded pit (742), with a depth of 0.16m and a maximum diameter of 0.60m, filled with a light brown sand (743) containing animal bone, pottery and shell inclusions.

Three small pits lay west of the western alignment of large pits:

- Pit 586 was sub-rounded and steep-sided, with a depth of 0.51m and a maximum diameter of 0.70m. This pit was filled with a deposit of mixed light and dark brown sands (587) containing a fragment of a steatite vessel (Table 3.1).
- Further south was a small, rounded, steep-sided pit (705), with a depth of 0.17m and a diameter of 0.40m; it was filled with a light brown sand (704) with animal bone and shell inclusions.
- South of pit 705 lay another small, rounded, steep-sided pit (702), with a depth of 0.28m and a diameter of 0.30m. This pit was filled with a light brown sand (703) with animal bone and pottery inclusions.

The eastern pit alignment

In the eastern part of the enclosed area were seven pits (589, 591, 597, 769, 712, 710 and 714), running parallel to the western group, in a north–south alignment (Figure 3.8).

- The most northerly was a sub-rounded, steep-sided pit (589), with a depth of 0.30m and a maximum diameter of 0.90m. It was filled with a dark brown sand (588; Figure 3.14) containing animal bones and a bone pin fragment that conjoins another fragment found in the adjacent pit 591 (Table 3.1). To the south, pit 589 truncated a smaller, sub-rectangular shaped feature (594), with a depth of 0.30m, filled by a mixed light and dark brown sand (595). To the west, pit 589 truncated a

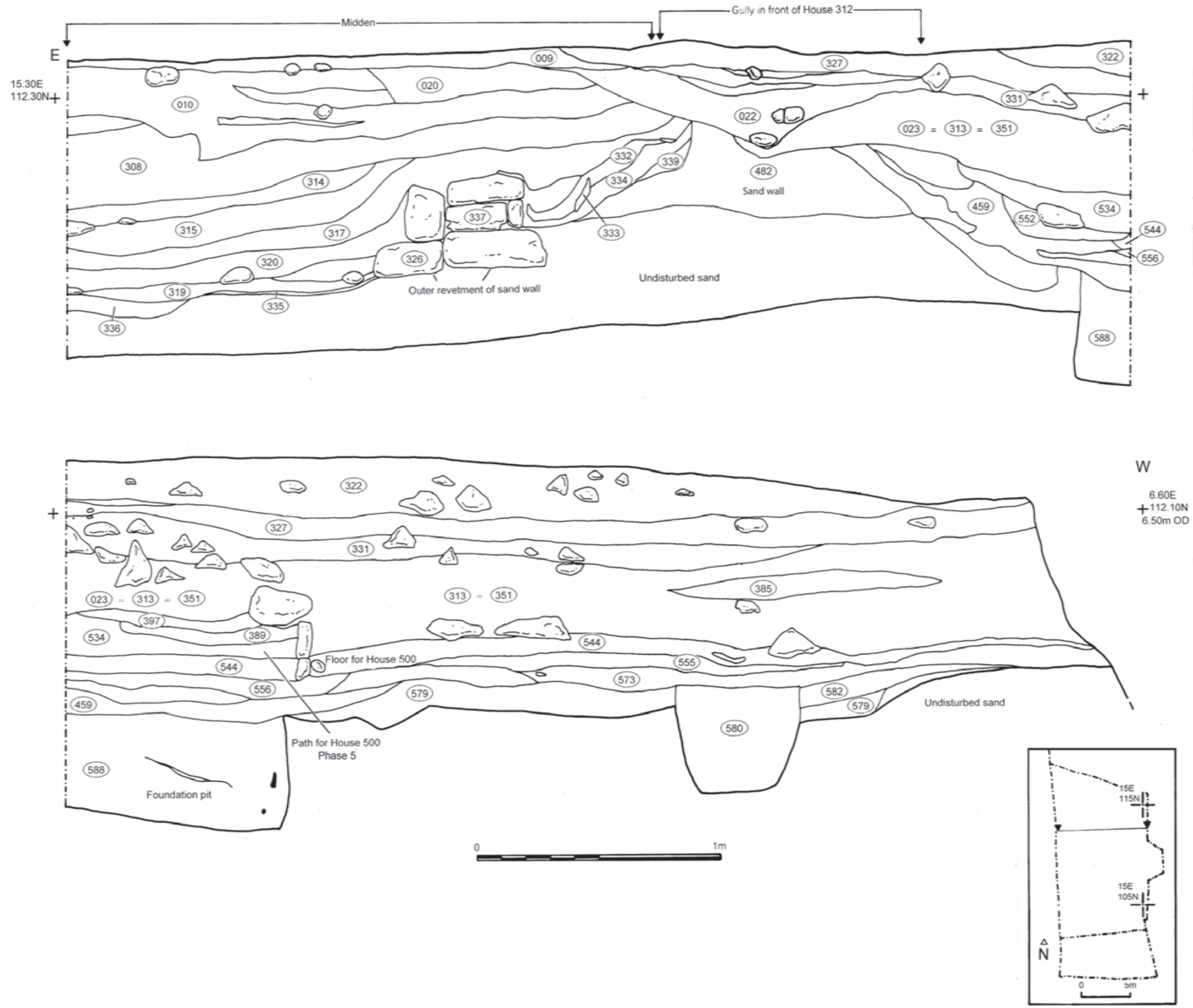


Figure 3.14. East–west section through pit 589, showing its position within the entire stratigraphic sequence of occupation

sub-rounded, shallow-sided feature (739), with a depth of 0.23m and filled with a light brown sand (738) with bone, shell, stone and pottery inclusions.

- To the south the next pit in the eastern alignment (591) was sub-rounded and steep-sided, with a depth of 0.40m and a maximum diameter of 1.10m. This pit was filled with a series of mixed light brown sands (590) containing animal bones and shells, copper-alloy and cetacean bone artefacts, and a bone pin fragment that conjoins another fragment from the adjacent pit 589 to the north (Table 3.1)
- Immediately south of pit 591 was a rounded, vertical-sided pit (597), with a depth of 0.54m and a maximum diameter of 1.10m. The pit was filled with a mixed light brown sand (596) containing black organic sand lenses, animal bones and iron artefacts including the lug of a cauldron (Table 3.1).
- The next feature to the south was an irregular, elongated, steep-sided pit (769), with a depth of 0.31m and an east–west length of 1.65m. This feature appeared, on the surface, to be several adjoining cut features but was filled with a single deposit of clean light brown sand (768) with organic sand lenses and bone inclusions.
- South of pit 769 was a small, irregular, shallow pit (712), 0.3m long and 0.2m deep, containing mixed light brown sand (713) with lenses of peat ash and small stones.
- Immediately south of feature 712, and probably cutting it, was a large, round, vertical-sided, flat-based pit (710), with a depth of 0.53m and a maximum diameter of 1.10m; it was filled with a light grey friable sand (711) containing animal bones and two finely executed bone pins (Table 3.1).
- The last and most southerly pit within the eastern alignment (714) was sub-rounded, vertical-sided and flat-based, with a depth of 0.23m, a north–south length of 1.40m and an east–west length of 1.00m. This pit was filled with a light brown friable sand (715) containing animal bones and bone and iron artefacts (Table 3.1).

The pits and postholes to the north

Included here are descriptions of the smaller features making up the hypothesized post-built structure (see Section 3.2 above).

In the northern part of the enclosed area, between the two pit alignments, was a large hollow or possible sunken feature associated with a series of postholes and peat ash deposits:

- Posthole 646 was 0.29m × 0.25m and 0.29m deep, and contained a post-pipe void (647) surrounded by packing stones and brown fill (645); it is potentially part of a timber structure described in Section 3.2 above.
- To the south of the most northerly pits in the western alignment was a 0.10m-deep stakehole (636), with a diameter of 0.10m and filled with an orange-brown organic sand (635).
- To the east of the stakehole was a shallow and irregular pit (629) filled with a mixture of orange, brown and grey organic sands (628).
- To the east of pit 629 were two larger postholes (638 and 633), part of the putative post-built structure that preceded the digging of the pits and the sandbank enclosure (Section 3.2), with approximate diameters of 0.20m and both containing stone post-packing. Posthole 638 had a depth of 0.26m and was filled with grey-brown sand (637). Posthole 633 had a depth of 0.42m and was filled with a mixed light and dark brown sand (632).
- To the immediate south was a stakehole (642; part of putative post-built structure), with a diameter of 0.12m and a depth of 0.12m, filled with a dark brown sand (641).

Further south, in the more easterly part of the enclosure, were a number of small cut features:

- a shallow irregular pit (640) filled with a mixed deposit of white and dark organic sand (639);
- southeast of this was a posthole (627; part of the possible post-built structure), with a depth of 0.23m and a diameter of 0.30m, filled by a dark brown sand (626) with fragmented bone inclusions.
- to the south was a stakehole (631; possible post-built structure), with a depth of 0.16m and a diameter of 0.12m, filled with a brown sand (630).

Continuing south, close to the eastern pit alignment, were three more cut features, making up part of the possible post-built structure.

- One was a posthole (unnumbered) within pit 739. This was a sub-rounded, steep-sided feature cut into the larger pit, with a diameter of 0.30m and with stone post-packing within its brown sand fill (738).
- Continuing south, posthole 761 had a diameter of 0.50m and was filled with a dark brown sand (760) with stone post-packing; it contained a whale bone clamp (Table 3.1).
- Posthole 708, east of posthole 761, had a depth of 0.16m and was filled with a brown sand (709) containing pottery, bone, worked slate, and a fragment of a copper-alloy artefact (Table 3.1).

Between and to the west of postholes 761 and 739 was a shallow, rounded pit-like feature (767), 0.11m and filled with a grey brown sand (766). Further west was an irregular, elongated pit (771), with a depth of 0.30m and an east–west length of 0.77m; it was filled by a brown sand (770). This fill was cut into by a shallow, rounded pit (773), with a depth of 0.19m, filled with a dark brown sand (772) with organic sand lenses.

To the immediate southwest of posthole 761 was a line of three pits or large postholes (750, 744 and 722), running northwest–southeast:

- The most northerly of these three features was a sub-rounded, steep-sided pit (750), with a depth of 0.30m and a maximum diameter of 0.52m. The pit was filled with a light brown sand (751).
- The central feature was a rounded, steep-sided pit (744), with a depth of 0.44m and a maximum diameter of 0.55m; it was filled with a light brown sand (745).
- The most southerly feature of this group was posthole 722 (a possible door-post of the putative post-built structure). Posthole 722 was a sub-rounded, steep-sided pit, with a depth of 0.40m and a maximum diameter of 0.76m. It was filled by a light brown sand (723) containing, within the upper part of the fill, antler and cetacean bone artefacts (Table 3.1). Fill 723 was also relatively rich in carbonized *Hordeum vulgare* grains. One of these produced a radiocarbon date of cal AD 1030–1220 at 95% probability (SUERC-5080; 905±35 BP).

To the southwest of pits 750, 744, 722 and 597 was an elongated, sub-rounded pit (764) with a depth of 0.31m and an east–west diameter of 0.80m. This pit was filled with a mid-grey/brown sand (765) with pottery, animal bones and charcoal inclusions. Carbonized residue from a pottery sherd from this fill produced a radiocarbon date of cal AD 990–1160 at 95% probability (SUERC-4891; 980±35 BP).

This elongated pit (764) was sealed by a thick spread of black and orange organic sand (579; phase 2), representing redeposited peat ash. To the west, pit 581 was truncated by a posthole (585) and all three were sealed underneath layer 582 (phase 2). The posthole was rounded, with a depth of 0.50m and a maximum diameter of 0.49m, and filled with a mixed brown sand with dark organic lenses (584).

In the northwest part of the trench, a spread of red-brown peat ash with shell and stones (607) partially surrounded and was cut by large pit 604 (Figure 3.13 [though the relationship between 604 and 607 did not extend as far as this drawn section]; see above for explanation of the difficulties of phasing this pit and surrounding layers). Layer 607 was overlain by an isolated spread of light grey sand (606) with inclusions of peat ash and charcoal flecks. Layer 607 contained a fragment of antler comb, a possible knife and a complete bone pin, broken in two (Table 3.1). Layers 607 and 606 were overlain by a friable light grey sand (603=605). The accumulated deposits and the remaining features in the northern end of the embanked area were sealed by an extensive spread of dark brown to black, sticky organic sand (573=620=622; phase 2).

The pits and postholes to the south

Within the southern part of the embanked area, between the eastern and western pit alignments, was a sub-rounded pit (759), with a depth of 0.08m and a maximum diameter of 0.46m (Figure 3.8). This shallow feature was filled with a lensed brown sand (758) with charcoal inclusions and much carbonized barley. A charred *Hordeum vulgare* grain from fill 758 produced a radiocarbon date of cal AD 980–1160 at 95% probability (SUERC-4910; 990±35 BP).

Pit 759 was truncated to the south by a shallow, steep-sided pit (757), with a depth of 0.10m and a maximum diameter of 0.44m. This pit was filled with a light brown sand (756) with charcoal inclusions. Both of these pits were subsequently truncated by a round, steep-sided feature (755), with a depth of 0.15m and a maximum diameter of 0.18m; it was filled with a brown sand (754) with dark brown organic sand inclusions. To the south of these features was a round posthole (748), with a depth of 0.24m and a diameter of 0.21m, filled by a dark brown sand and a single, large packing stone.

In the southern end of the embanked area, to the south of the pit alignments, was a series of small pits, postholes and 'scrapes'. This area had a densely but randomly distributed series of relatively small, irregular and shallow features filled either with a light brown sand or with organic sand similar to the floor from the house above, which sealed these features. A number of these features were not assigned context numbers, some because they did not appear to be anthropogenically created, others because they had been severely truncated.

- To the south of posthole 748 was a sub-ovoid pit (746), with a depth of 0.20m and a maximum diameter of 0.74m. It was filled by a multi-lensed, mid-brown and dark organic sand (747).
- To the southeast of this pit was a shallow, rounded feature (740), with a depth of 0.10m and a diameter of 0.40m, filled with a red-brown organic sand (741) with stone inclusions around the edges; it may be the base of a badly truncated posthole.
- To the west was a round, steep-sided posthole (727), with a depth of 0.16m and a diameter of 0.20m. It was filled with a light brown sand (726) with bone, charcoal and dark organic sand inclusions and a single packing stone.
- To the south was an irregularly-shaped, steep-sided pit (724), with a maximum depth of 0.25m and an east–west length of 0.62m. This feature had an undulating base that deepened to the eastern side where a post might have been set, although there was no postpipe within the fill. This pit was filled with a dark brown sand (725) with white sand lenses.

To the east was another irregular-shaped, steep-sided pit (729), with a maximum depth of 0.25m and a north–south length of 0.50m. The base of this pit was uneven and it might have held a posthole or stakehole, but the fill did not display any evidence of post-packing or a postpipe. The feature was filled with a light brown to white sand (728).

To the south was a sub-rounded, steep-sided posthole (731), with an approximate diameter of 0.36m, filled with a light brown sand (730) containing three post-packing stones.

Dog coprolites and activity patterning

One of the useful analytical procedures, if distasteful to some, that we employed during the excavation of the Iron Age broch at Dun Vulan was the analysis of the stratigraphic

and spatial distribution of canine faeces since their presence inside a dwelling provides a useful indicator of probable human abandonment of the living space (Parker Pearson and Sharples 1999: 64, 146, 178). Canine coprolites are easily recognizable from their size and shape, and from their texture since they contain small chips and fragments of animal bones.

In all, we recovered over 170 complete or fragmentary coprolites from Cille Pheadair, most of them from dogs but two or more probably from cats (on the basis of their small size). Further coprolite material was identified in the <10mm residues produced by the environmental sampling and flotation of layers of subsequent phases.

This figure of 170 coprolites is considerably in excess of the quantities recovered at Dun Vulan and may be explained in several ways:

- There might have been more dogs at Viking/Norse Cille Pheadair than at Iron Age Dun Vulan.
- The farmstead's dogs might have been allowed to roam (and defecate) more freely here.
- Cille Pheadair's sequence of habitation was punctuated with more or longer periods of abandonment.

A close contextual analysis of coprolites at Cille Pheadair suggests that all three explanations may help to explain their circumstances of deposition at particular times and locations on this site.

In phase 1 contexts, coprolites were found in the sandbank material (321) and in the revetment wall of the sandbank (482 and 150), as well as within the pits and postholes within the sandbank enclosure. Coprolites were found in the fills (605, 624, 715, 733, 736, 768) of six pits in different parts of the enclosure: pit 604 (probably feline), pit 625 (two of them feline), pit 714, pit 732, pit 737 and pit 769. One posthole (722, which might have been a door-post for a putative timber building) also contained fragments of three dog stools.

The presence of stools in the pits (whose fills were relatively clean) and in the construction fills of the sandbank enclosure is interesting and suggests that dogs were free to defecate in and around the site during initial construction and pit-digging.

Summary

The pits, postholes and other shallower cut features treated here as phase 1 are not all contemporary and were not all constructed as a single event, as some of the features cut through the material filling others. It is also possible that the construction of the first stone-built house (House 700) involved the excavation of a large trench or hollow that truncated the pits and postholes, so that their surviving depth was much shallower than when they were originally dug out.

There are 15 pits, in two parallel rows of nine and six, which could all be contemporary. Two of them (589 and 591) contain conjoining pieces of a bone pin (SF 2158 and SF 2184; Table 3.1), indicating that they are likely to have been contemporary.

The lines of large pits could be interpreted as postholes for a substantial timber building but this is unlikely because the fills of the pits do not contain postpipes or stone post-packing, which would be indicative of posts having been left to rot *in situ* or having been pulled out. The organic lenses detectable within some of the pits are unbroken and do not appear to have been truncated by, or backfilled around, posts. If large posts were ever set within these pits then their demolition would have involved the digging-out of an area around the posts so as to remove the post and packing, leaving only an enlarged pit, to be filled with clean sand. The fact that the pits were most probably backfilled relatively rapidly suggests that they were not quarry pits excavated for the construction of the revetted bank.

3.5 Soil micromorphology of windblown sand with ploughmarks (621)

C. Ellis

The sample (sample 7533) comprised three units. The lower unit is basically a windblown sand that has been slightly disrupted and re-worked by soil biota. There is no micromorphological evidence that this windblown sand was cultivated. There is a sharp boundary between the lower windblown sand and the overlying ash.

The main fuel constituent in this layer was wood (typified by fine-grained calcite crystal pseudomorphs of organic matter and fragmentary charcoal), although the survival of a few lenses containing irregular, fine sand-sized calcite spherulites indicates that some leaves might also have been burnt. The wood ash was not a product of an *in situ* fire but appears to have been deposited in a series of thin layers. Wind is the likely mode of transportation and deposition, accounting for the inclusion of a relatively high mineral and shell-sand content.

The survival of calcite crystals and charcoal demonstrates that the source of the ash was a relatively low-temperature fire of around 400° C (Courty *et al.* 1989; Simpson *et al.* 2003), typical of a domestic hearth. Furthermore, despite limited post-depositional bioturbation, the primary source of the ash is likely to have been fairly close by.

The ash is capped by a band of windblown sand that could have been either deposited by aeolian processes or dumped to seal the underlying deposit. There are a few clasts of the ash band in the upper windblown sand that have been incorporated by the limited activities of soil biota.

3.6 Artefacts and other remains from the pits

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville and C. Ingrem

The composition of the pit fills is of considerable interest for understanding why they were dug and backfilled so rapidly. Were these foundation pits with a ritual character

or were they filled with mundane materials? If the latter, what was the origin of these materials?

Fragmentation

As described in Chapter 1, many contexts were removed as bulk samples for flotation; all non-floated material was sieved on site through a 10mm mesh. This intensive sieving and flotation programme has enabled us to examine the fragmentation of sherds and bones from every context at Cille Pheadair. This method was employed at Dun Vulan and provided valuable insights into the formation processes by which different deposits had accumulated (Parker Pearson and Sharples 1999). The same method was also used at Bornais (Sharples 2005d; 2012; forthcoming) and at the Late Bronze Age/Early Iron Age settlement at Cladh Hallan (Parker Pearson *et al.* forthcoming).

The overall ratio of pottery:bone (about 1:7 at Cille Pheadair) is much lower on Norse-period sites than on pre-Viking sites and only very rarely does a context at Cille Pheadair contain as much or more pottery than bone (Figures 3.15–3.16).

- Most of the pits contained quantities of bones or of bones and sherds too few in number (<20 items) to allow any analysis of fragmentation other than presence/absence.
- A few contained middling quantities (20–100 items) of bone and pot (pit fills 587, 624, 736 and 738) or of bone alone (pit fills 605, 719 and 768).
- Even fewer contained large quantities (>100 items). These contexts divide into pits with medium-sized (mostly 15–40mm) bone fragments and sherds (fills 590, 596, 707 and 715) and pits with large-sized (>20mm) bone fragments but no sherds (fills 717 and 733).
- Other pits contained no material at all.

Although none of the assemblages are entirely composed of small material (mostly <30mm), the small proportions of large-sized fragments indicate considerable breakage before deposition. The variation in fills between medium-sized bones and sherds in four pits and large-sized bones but no sherds in two pits hints at different activities prior to pit-filling.

In contrast to the pits, posthole fills in phase 1 rarely contained any artefacts. The striking exceptions are fill 723 (fragment of comb, antler peg, cetacean bone pot-lid, sherds and bone), 762 (bone pin, bone awl, hone and bone fragments) and 632 (more sherds than bone fragments). The other major context of phase 1, the sandbank (150=321=482), contained large quantities of medium-sized bone and sherds, and a few iron artefacts.

Bone, antler and metal artefacts

The artefacts from phase 1 are listed in Table 3.1. Eight pit fills contained single iron artefacts (mainly nails or roves) and two of these (715 and 717) also contained a single antler or bone artefact. Other features had small numbers of either or both (588, 590, 707, 711, 723). The two remarkable pits were 597 in the eastern alignment and 604 in the western alignment. Pit 597 (fill 596) contained nine iron artefacts including a cauldron lug. Pit 604's fills (608, 605 topped by 602) contained a copper-alloy pin, a fragment of antler comb, other bone and antler artefacts, and many iron items. The ornamented iron strip fragments from 608 probably once decorated a wooden chest. The completeness of three of the bone artefacts and the former near-completeness of the comb are notable and suggest that this might have been a special deposit.

Metallurgical activity in or before this phase is demonstrated by a couple of pieces of slag, one from the fill of the sandbank (323) and one from the organic layer (607) cut by pit 604. A cross-shaped lead object also came from sandbank fill 323 (Table 3.1).

Ceramics

In most respects the ceramic assemblage from the pits is similar to those sherds found in other phase 1 contexts or from later periods on the site, though there are some interesting differences. Whilst proportions of blackening and interior residue are similar to those of later phases, there is a proportionally greater number of sherds with sooting and off-white residues in phase 1. As in later phases, most of the fabrics are of type A (with only fabrics D, G and I absent; see Chapter 12 for descriptions of fabric types). The base diameters of vessels are restricted to the size categories under 180mm (which may be a result of the small size of the assemblage) and yet the proportion of thick-walled pots is greater than at any time until phase 6. Very little platter ware was found in the pits or the sandbank, probably indicative of its general scarcity at this time rather than depositional selection.

Five pits yielded conjoining sherds, notably pit 764 (11 conjoins) and pit 604, with between two and four conjoining sherds in pit fills 587, 707 and 711. None of these provided complete vessels although those sherds from pits 764 and 604 are sizeable portions of the vessels from which they derive.

Clay

Single small clay lumps were recovered from pit fills 707 and 733 and a larger quantity of grey-green gritted clay was found in the sherd-rich pit fill 580. Raw clay is much more common in later phases and indicates, *inter alia*, activities associated with potting.

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 1 contexts produced only 214 identified fragments of bone. This small sample is dominated by sheep/goat, with cattle and pig *c.* two-thirds and one-third as frequent, respectively. There are single instances of horse, dog and cat. Red deer antler and bones and roe deer limb bones

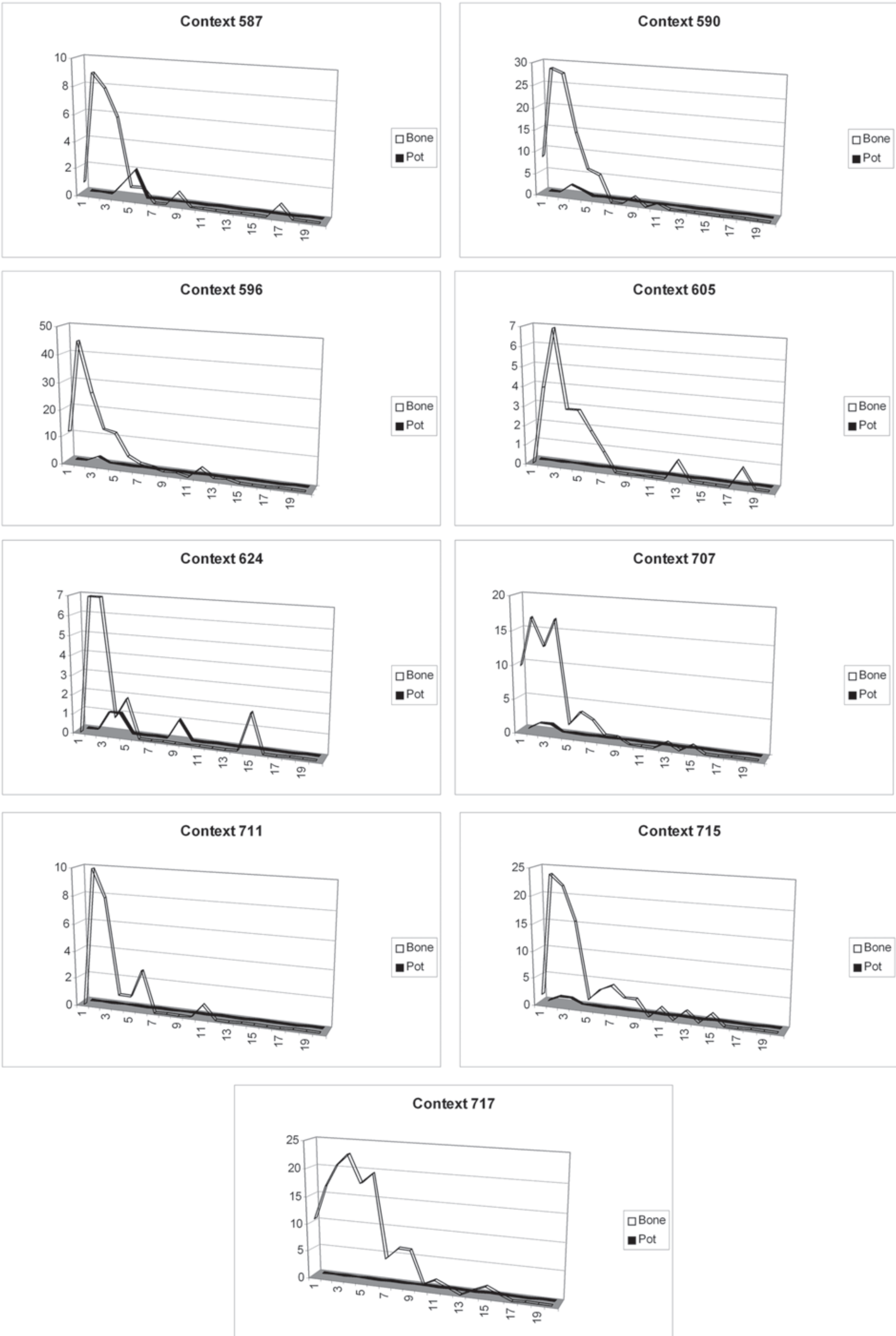


Figure 3.15. The fragmentation of sherds and bones in the pit fills in phase 1 (the y axis shows number of fragments and the x axis shows fragment length in cm)

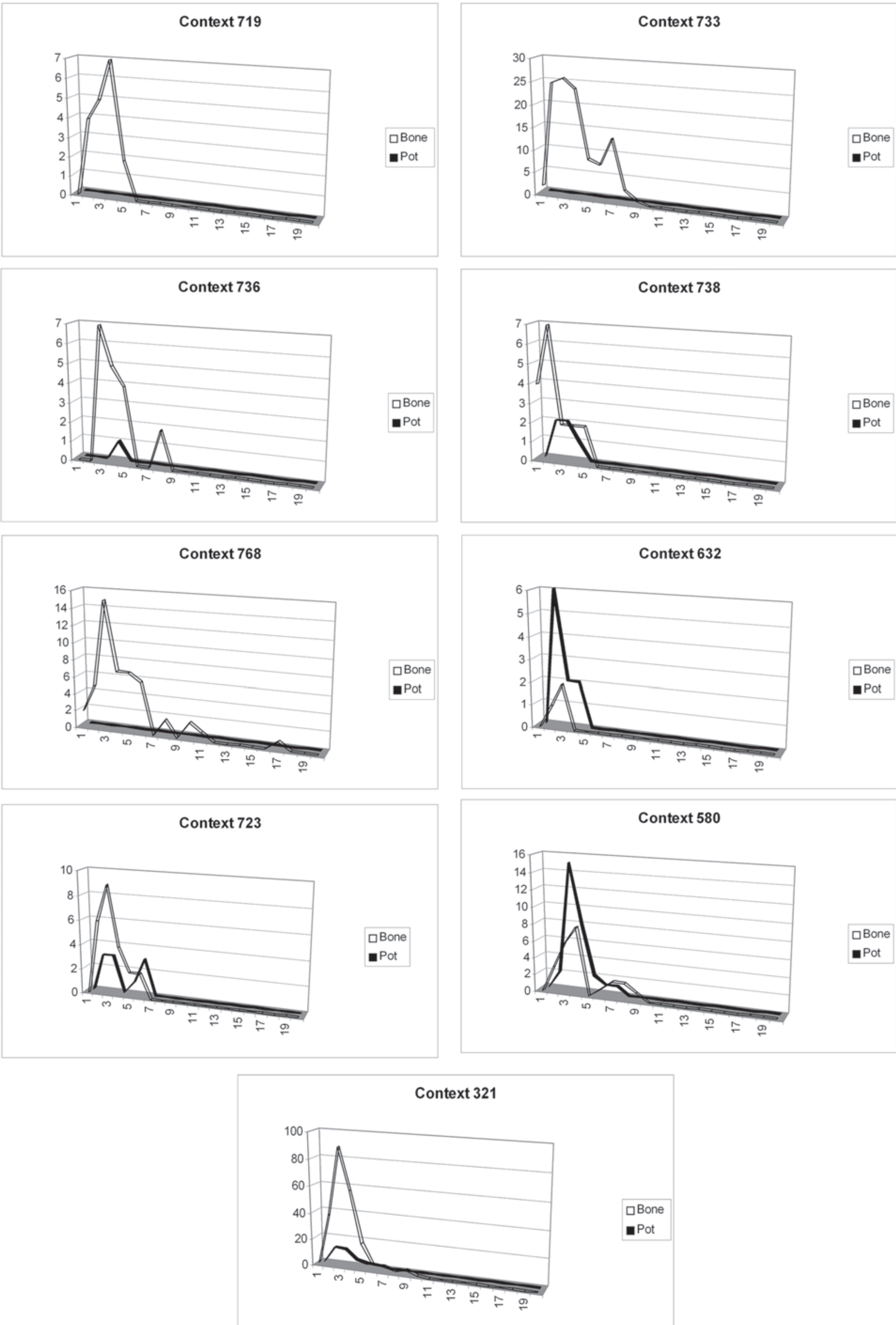


Figure 3.16. The fragmentation of sherds and bones in phase 1 posthole fills (632,723) and the sandbank (321)

are present. The other wild species present are otter and grey seal.

A total of 237 identifiable fragments of fish bone were examined from phase 1 deposits. Almost three-quarters (73%) of the >10mm material belongs to cod, pollack and other gadoid fish, and almost a quarter (23%) to herring. Eel, conger eel, wrasse and flounder are also present.

3.7 Overview

M. Parker Pearson

Four consecutive activities mark the initial period of use of this particular piece of ground, some 70m north of the burial cairn that commemorated a woman who died in cal AD 640–780 (AA-48605; 95% probability). The first of these events, the ploughing, is undated. The subsequent three activities – the possible construction of a wooden building, the sandbank construction, and pit digging and backfilling – probably happened over a brief period of time.

Ploughing

The area later occupied by the farmstead was ploughed east–west at some unknown date prior to construction and inhabitation of the site. Comprising part of a strip of plough land, they most likely indicate the previous existence of cultivated fields in this part of the machair.

The possible post-built structure

Lines of postholes and pits indicate the possible existence of a small timber structure, erected prior to the building of House 700. There is a case to be made for the postholes (but not the pits) being the earliest construction features on the site, pre-dating the sandbank walls and the rectangular hollow within the enclosure. The digging-out of the hollow would thus have removed the wooden house's floors, the upper fills of some of its postholes and the entire fills of others. Unfortunately we cannot be certain that the postholes ever formed a three-aisled or two-aisled timber longhouse.

The two lines of pits are possibly evidence of the dismantling of timber posts of a wooden building, or they were dug simply to prepare the ground beneath the first stone-walled house (or even to investigate its suitability). As explained earlier, pit 604 may not belong to phase 1 at all; pit 604 is therefore deliberately omitted from Figure 3.7. This version of the plan of the cut features shows a tight rectangular grouping of pits and postholes *c*. 8.50m north–south by 4.00m east–west. These could be interpreted as the below-ground remnants of an initial or even a second wooden longhouse. If the latter, this could have been erected within the hollowed-out sandbank enclosure because the spreads of burnt and black/red material in the northern part of the rectangular distribution of pits (Figure 3.7) could be the remnants of a hearth and its surrounding floor layer.

The sandbank enclosure

If the rows of postholes and pits can be interpreted as an earliest timber building(s) – and there is no certainty that the postholes predate the sandbank enclosure – then the construction of the sandbank by levelling down the area enclosed by it represents a second foundation of a dwelling here. The enclosure served to delimit a sunken rectangular space within which a new form of farmhouse (House 700; phase 3) was subsequently constructed in turf, stone and timber materials more in keeping with the indigenous practices of Iron Age builders in the Outer Hebrides. Once the sandbank enclosure was constructed, its interior was used for the digging of many pits.

Deposition in the pits as foundation deposits?

All the pits were filled with relatively clean, homogeneous sand. They produced an assemblage of animal bone fragments and occasional pottery sherds, and an unusual number of finds of iron objects and nails, bone tools, bone pins, a steatite vessel fragment, a hone and a copper alloy pin. The near-complete comb and other comb fragments, the nine pins and/or needles and the large number of other artefacts constitute a remarkable collection of artefacts from a relatively low volume of fill. For example, the assemblage from this first phase includes almost a third of all the pins and/or needles from the whole site. On the other hand, there is nothing particularly special about the fragmentation indices for bone fragments or sherds, other than that material from the phase 1 contexts is a little larger than interior floor-derived debris. The ceramics from the pits and sandbank show some degree of selection from the norm: they are smaller, chunkier and much more extensively sooted and marked with off-white residue than subsequent assemblages.

Yet is this merely casual rubbish thrown into pits? Unlike the foundation pits under Late Bronze Age/Early Iron Age houses at Cladh Hallan (Parker Pearson *et al*. 2001) and the Middle Iron Age wheelhouse at Sollas (Campbell 1991), there is no evidence for animal sacrifice. The character of the assemblages within these foundation pits at Cille

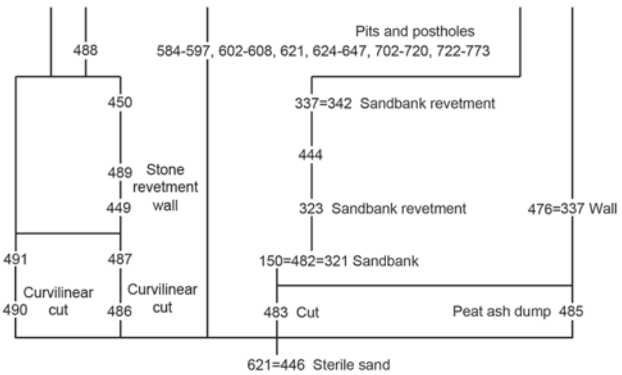


Figure 3.17. Stratigraphic matrix of contexts in phase 1

Pheadair is rather different. Animal burials appear to have vanished from settlement contexts in the Western Isles largely by AD 600 (Mulville *et al*. 2003). By the Norse period, emphasis seems to have been placed on special artefact deposition rather than on special animal deposits.

The evidence for ceremonial deposition in these pits is equivocal. The nature of much of the debris is unsurprising but there are unusual and substantial deposits in some of the pits whilst the apportionment of single or pairs of artefacts in other, largely empty pit fills is curious. The unusual features of the ceramic assemblage from phase 1 hint at activities that were different from the norm, perhaps a work party or a feasting occasion (or both) as the builders gathered together to found a new dwelling.

Note

1 Material from the sandbank was utilized as revetting material for the lower courses of the southern wall of House 500; see Chapter 6.

4 The earliest deposits above the pits (phase 2) starting *cal AD 945–1020*

M. Parker Pearson and M. Brennand

with contributions by C. Ellis, J. Bond, C. Paterson, J. Mulville and C. Ingrem

4.1 Chronology and stratigraphy of the phase 2 features

M. Parker Pearson

Phase 2 consists of two groups of layers and features. The first group was found in the northern half of the sandbank enclosure's interior, adjacent to the phase 3 House 700 (see Chapter 5) that occupied the southern part of the enclosure (Figure 4.1). The second group lay outside the entranceway to the sandbank enclosure, on its east side.

There are certain difficulties in distinguishing this phase as a separate chronological entity to phases 1 and 3. Some of the phase 2 layers described here could have been laid down during the same episode of activity in which various of the phase 1 pits were filled in (although the layers of phase 2 are, in every case, stratigraphically later than the pit fills). More likely, some or even most of phase 2's layers might have been deposited at the same time as House 700 was constructed and occupied.

This problem of chronology is more acute within the sandwall enclosure, where there was no observable stratigraphic relationship between the wall (700) and floor (701) of House 700, on the one hand, and the phase 2 layers to the north on the other. Outside the enclosure's entranceway, phase 2 layers and features were sealed beneath the lowest deposit associated with House 700's entrance passage. Although these layers outside the entranceway could have belonged to phase 1, they are notionally grouped as phase 2 so that all phase 1 features are within the enclosure.

4.2 Contexts within the sandbank enclosure

M. Parker Pearson and M. Brennand

Above the pits of phase 1 was a sequence of small, spread layers, of which 701 (the phase 3 floor of House 700; see Chapter 5) was the most extensive, covering the entire southern half of the sandwall enclosure's interior (Figures 3.2, 4.1). The phase 2 layers were mostly in the northern half of the enclosed area. The only phase 2 layers stratigraphically below floor 701 as well as being above phase 1 pits were 721 (a peat ash spread over pits 727 and 724) and 579 (another peat ash spread that extended beyond the northern edge of 701; visible in Figure 3.2).

These two localized spreads were probably the remains of a floor surface that might have been largely removed before floor 701 was laid. They could be all that remains of a building phase prior to House 700 and its floor, or the remains of a trampled construction layer created during the building of House 700. A charred seed from layer 579 produced a radiocarbon date of cal AD 1000–1190 at 95% probability (SUERC-4903; 955±35 BP). Two other localized spreads of dark brown peat ash, 601 (north of 579) and 623 (in the northern edge of the excavation), might have been part of the same eroded and discontinuous surface. A charred *Hordeum vulgare* grain from layer 601 produced a radiocarbon date of cal AD 1000–1190 at 95% probability (SUERC-4907; 955±35 BP).

In the northern half of the interior of the sandbank enclosure, overlying 579, there was a grey loose fill (582) that contained a startling number of metal, bone and stone artefacts (for SF numbers, see Table 4.2). A charred residue on a near-complete pot from 582 produced a radiocarbon date of cal AD 1040–1280 at 95.4% confidence (SUERC-4888; 850±35 BP). Layer 582 sealed phase 1 pits 581 and 585 (Figures 3.8, 4.1). Layer 582 was covered by a floor surface of compacted peat ash (620=622) with 573 (another compact brown-black layer) and 572 (see section drawings in Figures 3.2, 3.14, 4.2).

The peat ash surface (620=622=573=572; Figures 4.1–4.2) sits in uncertain relationship to phases 1 and 3. It is stratigraphically later than the pits and postholes of phase 1 but earlier than the sand layers (405=600) into

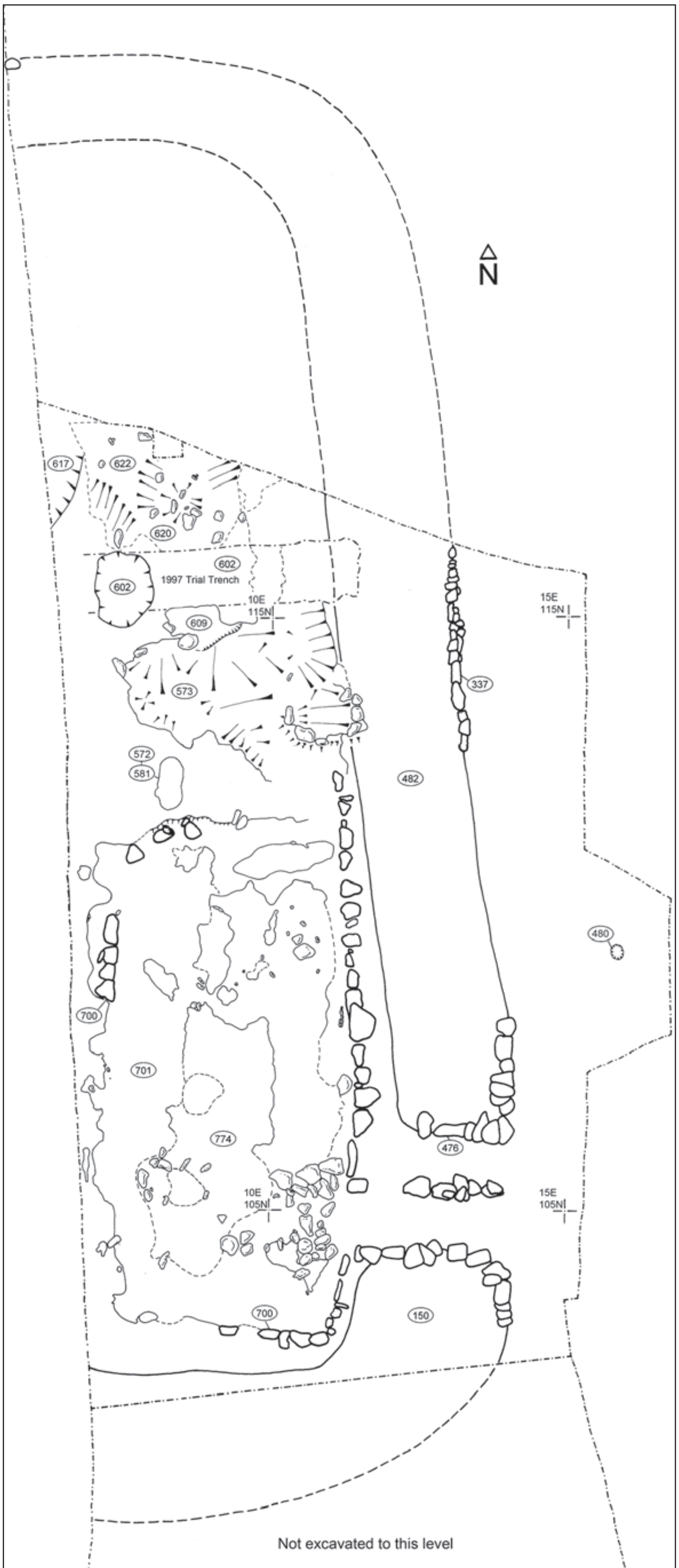


Figure 4.1. Plan of the layers of phases 2 and 3 within the sandbank enclosure (also showing pit fill 602 of phase 1)

which the later House 500 was cut in phase 4. Therefore this surface (and perhaps other spreads such as 582, 573 and 572) could well be associated with the construction and use of House 700 in phase 3 although we have assigned it to phase 2 because its stratigraphic relationship to House 700 cannot be demonstrated.

Above the peat ash surface (620=622=573=572) was a sequence of spreads: 618 (a loose brown fill within which was a thin humic layer, 648) below 619 (a small peat ash surface). These lay below 354, a sand fill into which House 500 (phase 4) was revetted (Figure 4.2). Carbonized residue from a near-complete pot in layer 618 produced a radiocarbon date of cal AD 780–990 at 95% probability (SUERC-4890; 1135±40 BP).

In 1997 a small test trench measuring 4.00m east–west by 1.00m north–south was dug through the northern part of the enclosure (Figures 3.13, 4.1). Unfortunately its sequence of layers cannot be matched with the overall sequence recorded in 1998. At its base was pit 604 (attributed to phase 1 but potentially belonging to a later phase; see Chapter 3), filled by finds-rich layers, and capped by a fill layer 602. Above 602 were layers 601 (peat ash surface) and 610 (a loose grey sand that had been cut by a small pit, 609; Figure 4.1). These were covered by 600, a mid-grey/brown sand (interpreted as a levelling layer and equated with 405 but the two have different fragmentation profiles). Bedded into layer 600 was a small semi-circular ring of stones, which was covered by a mid to dark brown sand (473).

4.3 Contexts in the northern part of the sandbank enclosure and outside it

M. Parker Pearson and M. Brennand

The north–south sand cliff section to the north of the site was cut back and cleaned during the last days of excavation in 1998 in order to determine the full extent of the settlement in that direction. Deposits relating to the occupation of the settlement were recorded for a further 12.00m beyond the northern limit of the excavations. The deposits stretched for approximately another 7.00m–10.00m beyond this, but the vertical sand cliff in this area was prone to collapse and the deposits could not be recorded with safety.

The white sand of the sandbank could be seen in profile in the section approximately 5.00m from the edge of the excavated area, with revetting walls on its internal and external faces. Within the area between the sandbank and the northern edge of the excavated site was a series of light sterile sands and dark organic sands, whose maximum depth was 0.90m. The first deposit south of the sandbank enclosure's north wall to post-date it was a grey sand (649) within a depression or sunken feature (650) that probably equates with the deposits and pits of phase 2. This fill (649) produced pieces of a steatite vessel and a large fragment of a large ceramic bowl (for SF numbers, see Table 4.1).

Unfortunately, the relationship of this feature (650) and its fill (649) to other layers was unclear. It is definitely later than both the sandbank enclosure wall (150=482=321) to its north and layers 618 and 619 to the south, but was either overlain by or cut into layers 600 and 354. If the former, this pit and its contents can be placed within the upper part of phase 2. If the latter, then it should be grouped in phase 3 or even phase 4.

Coprolites

There are a surprising number of coprolites from phase 2. They were particularly prolific in the enclosure's northern end within layers 354 (probably feline), 573, 582, 600, 618 and 620. All of these layers (later than the pits and postholes) lie to the north of the phase 3 house (House 700; see Chapter 5) and it is possible that some or even all of them were associated with the use of House 700 if phases 2 and 3 were in fact contemporary (see section 4.1 above for discussion of the stratigraphic and chronological problem with these contexts). Only 620 is a floor layer and the remainder of the layers in question are composed

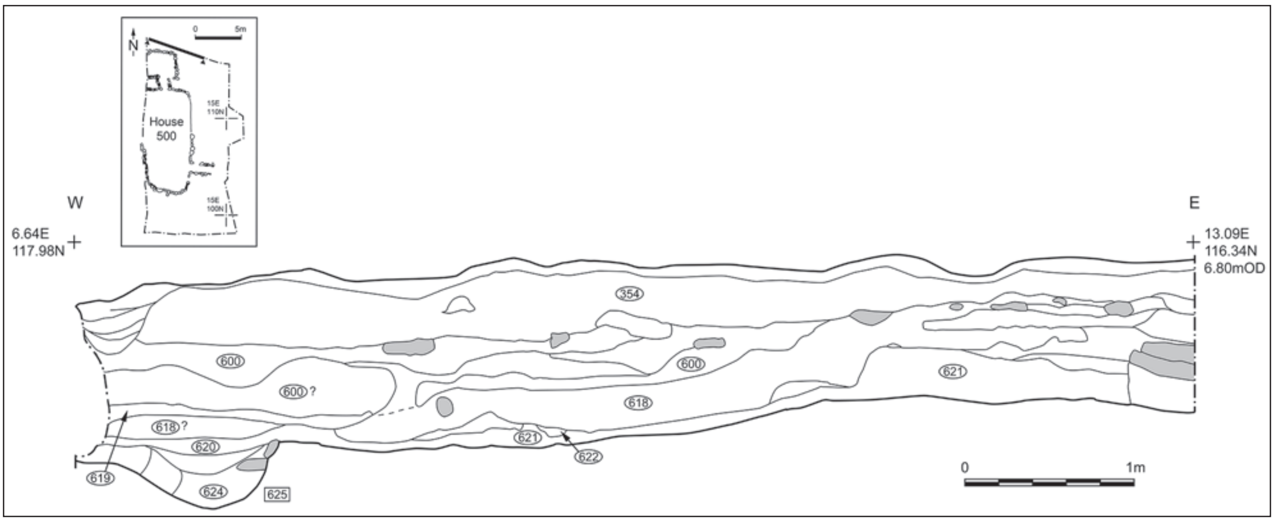


Figure 4.2. Section along the north edge of the excavation

Table 4.1. Phase 2 non-ceramic artefacts by context and context type

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 2				
Depression 650	649	2037	fragment of steatite vessel	16.4
		2050	fragment of steatite vessel	16.4
		2407	fragment of large ceramic bowl	12.4
P/hole 451	452	1923	bone point or awl	14.2
Sand layer	457	2684	bone point fragment	
		2044	perforated cetacean vertebral epiphysis (pot-lid)	14.9
		see Chap 15	iron nails	
Midden layers above sandbank	453	2804	bone point	
		2176	stone rubber or polisher	16.2
			fragment of oval ceramic lamp	12.19
		see Chap 15	iron knife, rove	
	339	1239	bone spindle	
		see Chap 15	pierced iron fitting, rove, unident. iron fragments	14.1
	334	1227	steatite weight or linesinker	16.4
		see Chap 15	riveted iron fitting	
	332	see Chap 15	iron nails, roves, riveted fitting, unident. fragments	
	455	see Chap 15	iron nail	
	456	see Chap 15	iron plate fragment	
	484	2751	worked antler tine	
		see Chap 15	iron rove	
Peat ash surface	572	2205	fragment of comb case, conjoining SF 2109 and possibly SF 2107	13.1
		see Chap 15	iron rove	
Peat ash surface	573	2107	fragments of comb case, possibly conjoining SF 2109 and SF 2205	13.1
		2109	fragment of comb case, conjoining SF 2205 and possibly SF 2107	13.1
		2113	worked antler burr	14.4
		2117	worked antler tine	14.4
		see Chap 15	iron nails	
Peat ash surface	620	see Chap 15	iron nail, strip	
Peat ash surface	622	2120	comb tooth	
		see Chap 15	iron tool, rove	
Peat ash surface	579	see Chap 15	two iron fittings, a bar, a plate fragment	
Peat ash surface	721	see Chap 15	iron nail	
Sand layer	473	2703	worked antler tine	
		see Chap 15	iron nail	
Sand fill	354	see Chap 15	iron nails, plate fragment	

of imported fills. Outside the entranceway (see below), pit fill 481 contained coprolites, as did one of the midden deposits (332).

4.4 Outside the entranceway and east of the sandbank enclosure

M. Parker Pearson and M. Brennand

Layers and features assigned to phase 2 accumulated outside the eastern wall of the sandbank enclosure, both on the level, bare sand to the east and along the eastern lip of the sandbank itself, filling an eroded hollow between the bank's exterior revetment wall and the middle of the bank.

The ground surface east of the sandbank enclosure

Outside and to the north of the front of the entranceway, east of the revetment wall (337), there was a square, steep-sided posthole (451) with a depth of 0.40m and with a north–south and east–west length of 0.40m (Figures 4.3–4.4). The feature was cut into the sterile underlying sand and filled with a dark brown to black sand (452) with packing stones around the sides. It contained a bone point (Table 4.1). To the north of posthole 451 there was a shallow east–west gully (439) that did not quite abut revetment wall 337 and contained a mixed dark brown sand (438) with stone inclusions. Gully 439 was cut into the two earliest layers to accumulate outside the sandbank, both light brown sands (layer 437 and, above it, 436). These deposits abutted, and were therefore later than, the sand bank's revetment wall 337 (phase 1).

To the south of the square posthole, further east from the revetment wall (337), there was a rounded, steep-sided pit (480) with a depth of 0.26m and a diameter of 0.25m (Figures 4.1, 4.3). The pit was filled with a grey sand (481) that contained dog coprolites but was otherwise sterile. The pit was sealed by an isolated spread of slightly organic red-brown sand (479) onto which was built an east–west wall of five unworked beach cobbles (478). The wall only survived to one course in height, running from the new outer skin (326) of the revetting wall (see below) to beyond the edge of excavation to the east. All of these layers and features were sealed by a spread of compacted, dark brown organic sand (455) overlain by 454 (phase 3; see Figure 5.34).

Layers on top of and outside the sandbank

The first midden layer to accumulate on top of the sandbank was a black sand layer (484) deposited along the east wall north of the entrance. This was covered, at the sandbank terminal where it met wall 476, by a layer of very soft mixed white and grey-brown sand (457; Figure 4.3), containing a small drilled cetacean disc. Over this were localized patches of a yellow-brown sand (458) and a grey sand (456). These layers were covered by a narrow wedge of mottled grey sand (453), containing a stone rubber and a fragment of ceramic lamp (Table 4.1). Layer 453 equated to layers 332, 334, 338 and 339 further north (see Figure 3.14). These layers spilled over the replaced upper courses of the revetment wall 337 and were held in place by a new outer skin (326) to the revetment wall. A very fine steatite linesinker was found in layer 334 (see Chapter 16).

Layer 453 was held in place by the rebuilt upper courses of wall 337 and by the new revetment wall 326. This additional revetment wall (326) was, in certain places, built directly against the repaired wall 337 (see Figure 3.14). Wall 326 bonded with wall 476 at the northern terminal of the sandbank enclosure's entrance.

Outside the sandbank enclosure, the earliest layers of the midden were 479 (deposited after the construction of revetment wall 326 and lapped up against it), and 455, a brown sand forming a trampled surface on top of the sterile sand of the sandbank. Layer 455 is the top of the phase 2 deposits outside the sandbank enclosure and it was covered by layer 454 (see Figure 5.34).

4.5 The soil micromorphology of the levelling layer (600)

C. Ellis

The sample (MM6) comprises two bands of windblown sand, distinguishable by a diffuse but distinct boundary and the presence of very few ash clasts in the upper band. The ash clasts in the upper band comprise mainly turf ash, characterized by a medium sand-sized mineral content, lack of shell fragments, rubified fine mineral material and charcoal. The upper band also contains a couple of clasts of wood ash and one possible clast of omnivore coprolite (yellow in plane polarised light [PPL] and oblique incident light [OIL]), silt-sized amorphous organic matter, mineral grains (quartz and shell) and a small fragment of bone. The ash clasts and coprolite clast have been rounded by aeolian processes and it is likely that these were eroded, perhaps from a damp midden within which the ash and organics were semi-consolidated, before being incorporated into the sand prior to its final deposition.

4.6 Artefacts and other remains from phase 2

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville and C. Ingrem

The numbers of finds in the contexts of phase 2 range from none in certain features (437, 458, 481, 601 and 623 with a single bone in 610) to large quantities of all types of materials in 582, 600, 618, 573, 620 and 354 (Figure 4.5).

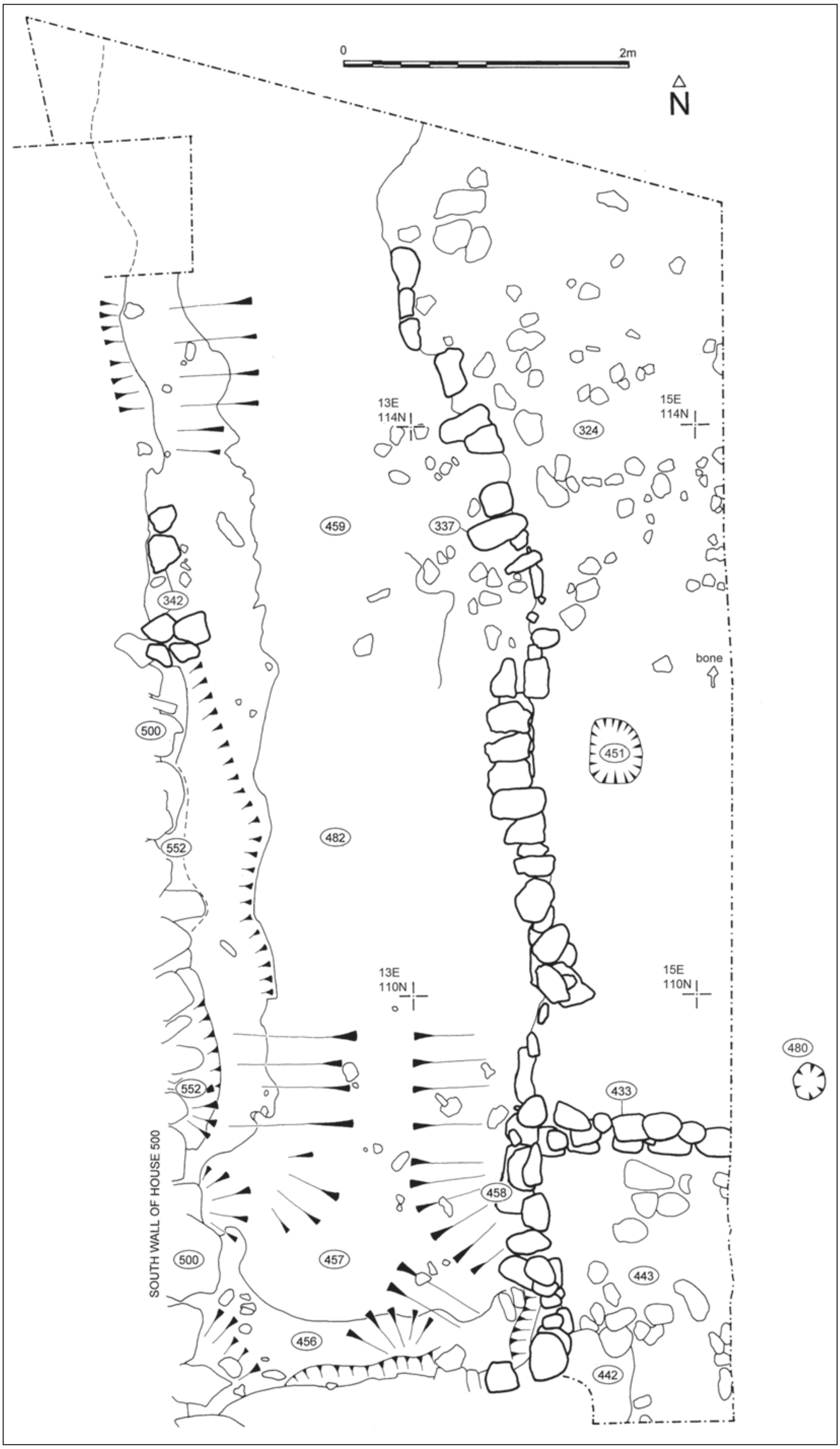


Figure 4.3. Plan of the features in the sandbank enclosure's entrance and the east wall in phases 2 and 3

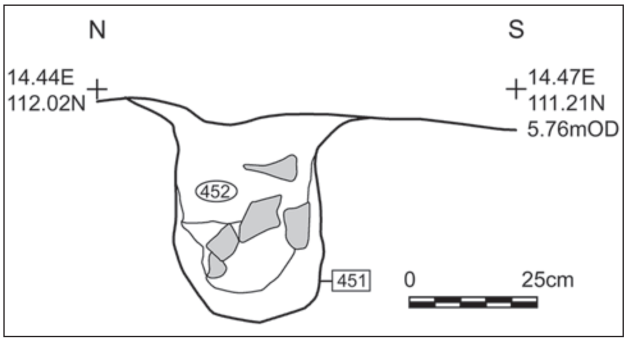


Figure 4.4. Section of posthole 451, outside the sandbank enclosure

Within the sandbank enclosure

Within the sandbank enclosure the peat ash surfaces (579, 601, 620=622=573=572, 623 and 721) mostly share a similar fragmentation pattern of small bone fragments and lower proportions of medium-sized sherds, although their assemblages vary in quantity from large to small. This is a classic floor fragmentation profile and closely matches that for House 700's floor (701) in phase 3 (see Chapter 5). The peat ash 'surface' 579 is anomalous in this respect because of the large sizes of some of the bone fragments and sherds within it.

- Assemblages of medium-sized bones and medium-sized sherds were noted in the peat ash surface (572, above phase 1 pit 581), in sand layer 617 (Figure 4.1) and in the fills with organic material (582, 618).
- Other layers were fills and levelling layers with medium-sized bone and small sherds (600), medium-sized bone and large sherds (473), small-sized bone and medium-sized sherds (354) and small-sized bone with small sherds (405).

Layers 572, 573, 620, 622, 579, 721, 473 and 354 contained a sprinkling of bone, antler and iron artefacts (Table 4.1), the most unusual item being fragments of an antler comb case from layers 572 and 573. The iron objects from these contexts are few in number, but include iron tools, fittings and plate fragments as well as nails, clench nails and roves (see Chapter 15).

The surprising deposits were 582, 600 and 618. These appear to have been deposited onto and under peat ash surfaces, either as levelling layers of made-up ground or as fillings on top of earlier surfaces.

Layer 582 contained 15 iron artefacts, 11 bone and antler artefacts, including a near-complete tenth/eleventh-century comb and a lucet (thread-making tool), and two pieces of slag (Table 4.2; see Chapter 17 for slag). In layer 600 there were five bone and antler artefacts, including another lucet, 11 iron artefacts, two pieces of lead (one of them probably a weight), and a piece of slag (Table 4.2). Layer 618 contained eight bone and antler artefacts (including a rare piece of worked walrus ivory), fragments of a steatite vessel, 10 iron nails, clench nails and roves, and a piece of slag.

Layers east of the sandbank enclosure and on top of the sandbank

Here the midden layers contained medium-sized bone with either no sherds (332, 339, 484, 479) or small sherds (334, 455). The fill layers similarly all contained medium-sized bone fragments with either no sherds (436, 438, 452), small sherds (457) or medium-sized sherds (453). Only 453 and 457 produced large assemblages (>100 sherds) whilst 455, 332, 439 and 452 were too small (<20 items) to put too much reliance on their patterning.

The assemblage of artefacts from these contexts (453, 457, 332, 334, 339, 455. 484. 452) includes an iron knife as well as nails and roves, a very few bone artefacts and a fragment of ceramic lamp (Table 4.1). Four pieces of slag came from 332 and 339.

Ceramics

The ceramic assemblage from phase 2 is relatively small but it exhibits the same main characteristics as the pottery for the next three phases. Sooting occurs on 19% of sherds, blackening on 11%, internal residues on 10% and off-white residues on just 2%. Numbers of platter ware are slightly higher than in both phases 1 and 3 and there is a full range of vessel shapes, thicknesses and sizes. Fragments of either one or two very large pots came from 649, 354, 600 and 618. With rim diameters over 350mm, these are amongst the largest vessels from the site.

Clay

As for phase 1, there was very little raw clay in phase 2 contexts, in contrast to later phases with buildings. A small lump came from the peat ash surface 579.

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 2 contexts produced 513 identifiable fragments of bone. The predominant species is sheep/goat, *c.* 200 fragments, followed by cattle and pig. Other domestic species present are goat and cat. Wild species are represented by red deer antler fragments, along with four upper limb bones, a calcaneum and phalanges, a few roe deer forelimb bones, a single occurrence of pine marten (*Martes martes*) and a group of seal bones from context 573.

Phase 2 contexts produced 381 identifiable fragments of fish bone. The majority belong to cod-family fish (89%), particularly cod and pollack; herring are fairly well represented (10%) with conger eel and flatfish also present.

4.7 Overview

M. Parker Pearson

There is no doubt that phase 2 presents a number of unresolved problems.

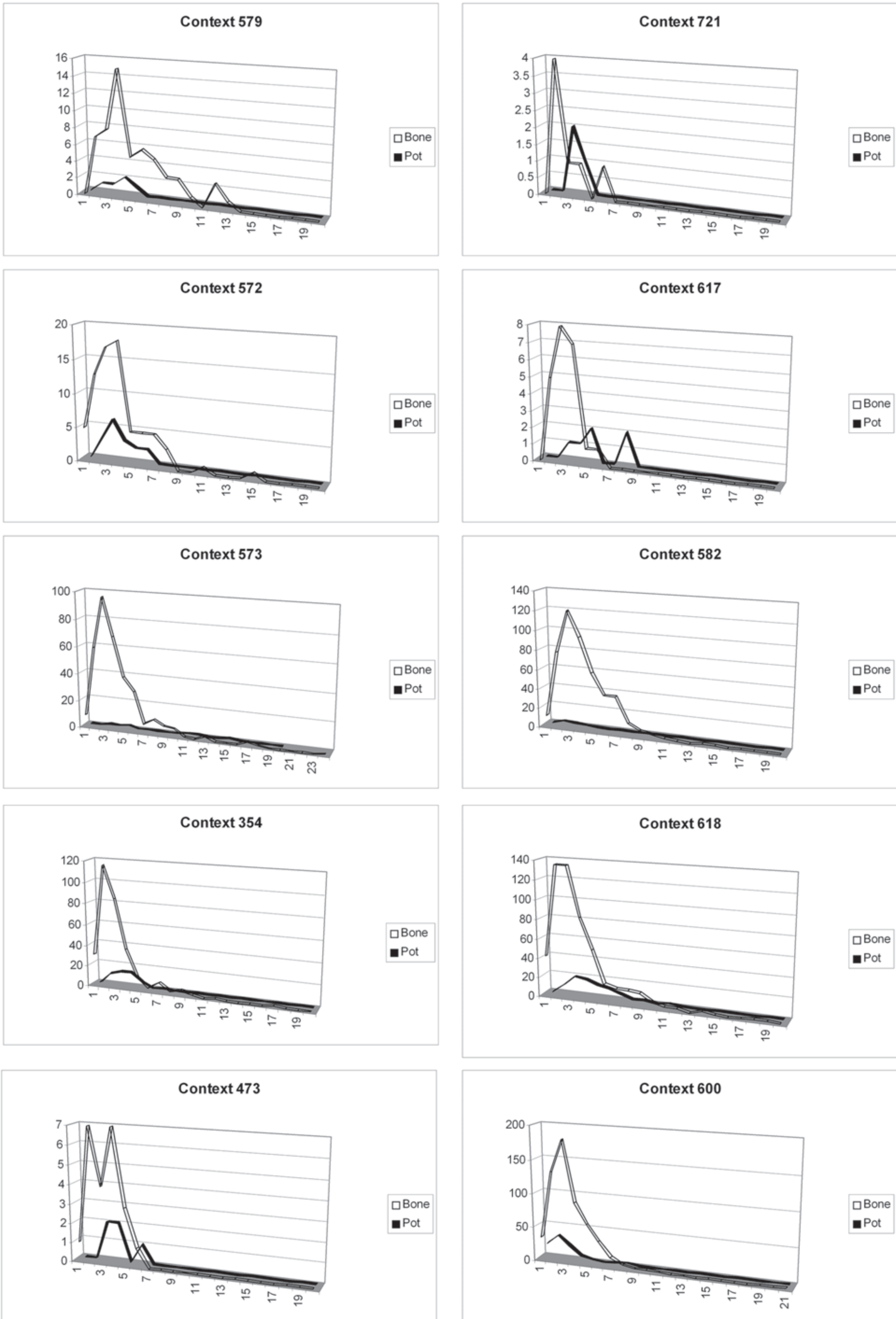


Figure 4.5. The fragmentation of sherds and bones in phase 2 surfaces (579, 721, 572, 573), sand layer (617) and levelling layers (582, 618, 473, 600)

Table 4.2. Phase 2 non-ceramic artefacts by context from levelling layers

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 2				
Levelling layer	582	2132	near complete single-sided composite comb	13.2, 13.7
		2203	comb tooth-plate	13.1
		2201	bone lucet (thread-making tool)	14.1
		2125	bone pin fragment	13.10
		2126	faceted-head bone pin	13.10
		2133	bone pin fragment	13.10
		2200	perforated pig fibula pin	13.10
		2681	bone point	
		2686	bone point fragment	
		2750	worked antler tine	
		2752	worked antler tine	
		see Chap 15	iron knife tang, knife tip, possible needle, cauldron fragment, nails, roves, riveted fitting, unident. iron fragment	
Levelling layer	600	2069	comb tooth	
		2682	bone point	
		1808	bone lucet (thread-making tool)	14.1
		2806	bone counter or blank for a spindle whorl	
		2104	worked antler tine	14.4
		1809	lead bar, probably a weight	13.15
		1949	lead strip	13.15
		see Chap 15	iron container, nails, roves, strip, unident. iron fragment	
Levelling layer	618	2099	single-sided comb end-plate	13.1
		2186	comb tooth-plate	13.1
		2092	perforated pig fibula pin	13.10
		2679	unfinished bone toggle	
		2687	bone point fragment	
		2688	bone point fragment	
		2101	whale bone tool	14.7
		2527	piece of worked walrus ivory	
		2094	fragment of steatite vessel	16.4
		2097	fragment of steatite vessel	16.4
		2098	fragment of steatite vessel	16.4
		2175	fragment of steatite vessel	
		see Chap 15	iron nails, roves	

- Is it truly a definable stratigraphic block separate from phases 1 and 3?
- Or could the layers and features in the area east of the sandbank wall be assigned to phase 1 and those inside the enclosure be assigned to phase 3?
- Also, the spreads of compressed peat ash within the enclosure had the appearance, structure and fragmentation pattern of floors and yet there were no apparent walls or roof supports associated with them. These spreads might have been the surviving surfaces of an outdoor yard. Alternatively these areas were indeed floors in the putative roofed building of phase 1.

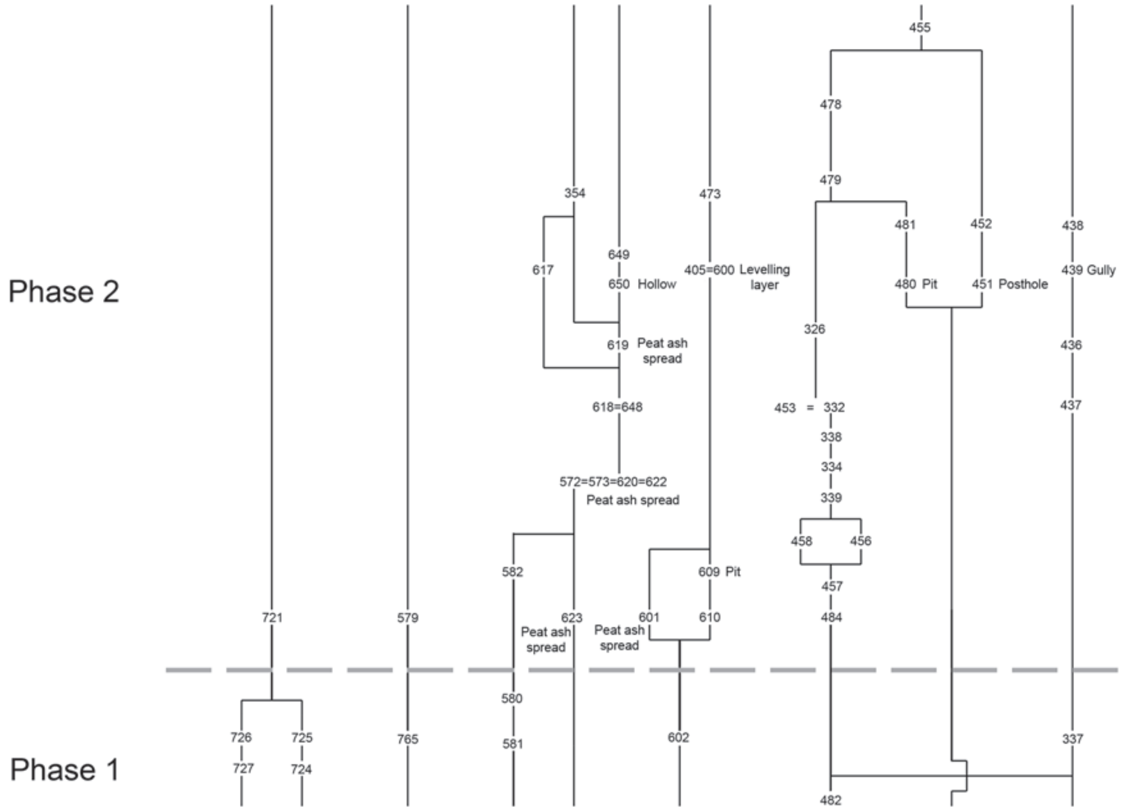


Figure 4.6. Stratigraphic matrix of contexts in phase 2

- Therefore, might the post-built structure assigned to phase 1 actually belong with these 'floor' surfaces of phase 2?

The sequence within the sandbank enclosure is of a succession of possible floor surfaces interspersed with fill layers, with the fragmentation of bones being consistently greater in the former than in the latter (Figure 4.6). The large quantities of metal and worked antler and bone artefacts in the fills are noteworthy and the near-complete comb from 582 raises the possibility that these were not casual losses but deliberate deposits. Many of the fill layers contained coprolites, but the only possible floor surface to yield such material was 620. The two finds of large ceramic vessel(s) raise the possibility of a mass cooking event being staged in phase 2, possibly as part of festivities accompanying house-building.

Outside the sandbank walls, there was a scatter of cut features – a gully (439), a pit (480) and a posthole (451) – in this phase. The placing of a bone point in posthole 451 might have been deliberate. During this period the outer stone revetment wall (337) required repair and eventually rebuilding (326) as a series of midden layers accumulated on the eastern side of the eroding sandbank.

5 The first stone longhouse: House 700 (phase 3), constructed *cal AD 1030–1095*

M. Parker Pearson and M. Brennand

with contributions by H. Smith, H. Manley, P. Marshall, J. Bond, C. Paterson, J. Mulville and C. Ingrem

5.1 The house and its deposits

M. Parker Pearson and M. Brennand

House 700 was the first stone longhouse to be built within the embanked area in what was to become the centre of the farmstead. The house walls and floor were subsequently truncated by the construction of House 500 and only elements of the house structure of House 700 survived (Figures 4.1, 5.1).

Statistical modelling of radiocarbon dates places House 700's construction within the period *cal AD 1030–1095* (*95% probability*) and probably *cal AD 1040–1075* (*68% probability*). Its demolition is undated but it might not have been long before the construction within its footprint of House 500 in *cal AD 1060–1110* (95% *probability; House 500_built*; see Figure 24.4) and probably *cal AD 1070–1100* (68% *probability*). House 700 was thus probably occupied for a period of a single generation only.

The longhouse was aligned north–south and had an internal length of approximately 8.40m and a width of 4.00m at its centre (Figure 5.2). On the southern, western and northern sides only two short stretches of the lowest course of walling survived. They were constructed of unworked beach stones with no bonding material. The eastern wall of the longhouse ran on exactly the same alignment as the eastern wall of the subsequent house (House 500) and was constructed of large flat stones set on their ends and laid in a shallow slot, with smaller stones used to wedge the larger ones at their base. There were also upright, orthostat stones to either side of the entrance. This was the only instance when this form of construction technique was used on the site.

The large stones within this eastern wall were not beach stones and appeared to be roughly hewn. They presumably came from a location further inland, possibly robbed from an earlier structure. It is interesting to note that the kerb of the Pictish square cairn is constructed in exactly the same style as the eastern wall of House 700, with large upright stones set in a shallow bedding trench and wedged with smaller stones at their base. It is possible that a similar structure was the source of the stone and the stylistic inspiration for the eastern wall of House 700. This stretch of wall was slightly remodelled when it was incorporated *in situ* into House 500's east wall in phase 4.

The house was sunken-floored and the lower courses of the walls were set into and lined a construction cut (775), as with all the subsequent houses on the site. Evidence for this survived only at the northern end of the house, where the construction cut (775) for the house wall (700) truncated a deposit of black and orange peat ash (579; phase 2) with a maximum depth of 0.38m. On the east side of the house, the wall of House 700 was set into a deposit of grey peaty sand (459) that appears to have filled the base of the wall cut before the stones were laid. No elements of the above-ground structural wall of House 700 survived. It is therefore not known whether the walls above these lower courses of stone were constructed of stone or of turf, or a combination of the two (as was the subsequent House 500). Likewise, as discussed in Chapter 3, it is not known whether the construction of House 700 truncated the pits and postholes that had been previously cut into the undisturbed white sand below.

It appears that the entrance to House 700 – towards the southern end of the eastern side – was subsequently reused by House 500 and that its portals and its 2.70m-long entrance passage were incorporated unmodified within the rather grander entrance passageway of House 500. The first phase of stone paving (583) within this passageway, laid directly onto the undisturbed sterile white sand, most likely belongs to House 700, although this could not be proven beyond doubt (Figure 5.2; see Chapter 3 for discussion of the re-use by House 700 of the entrance to the sandbank enclosure).

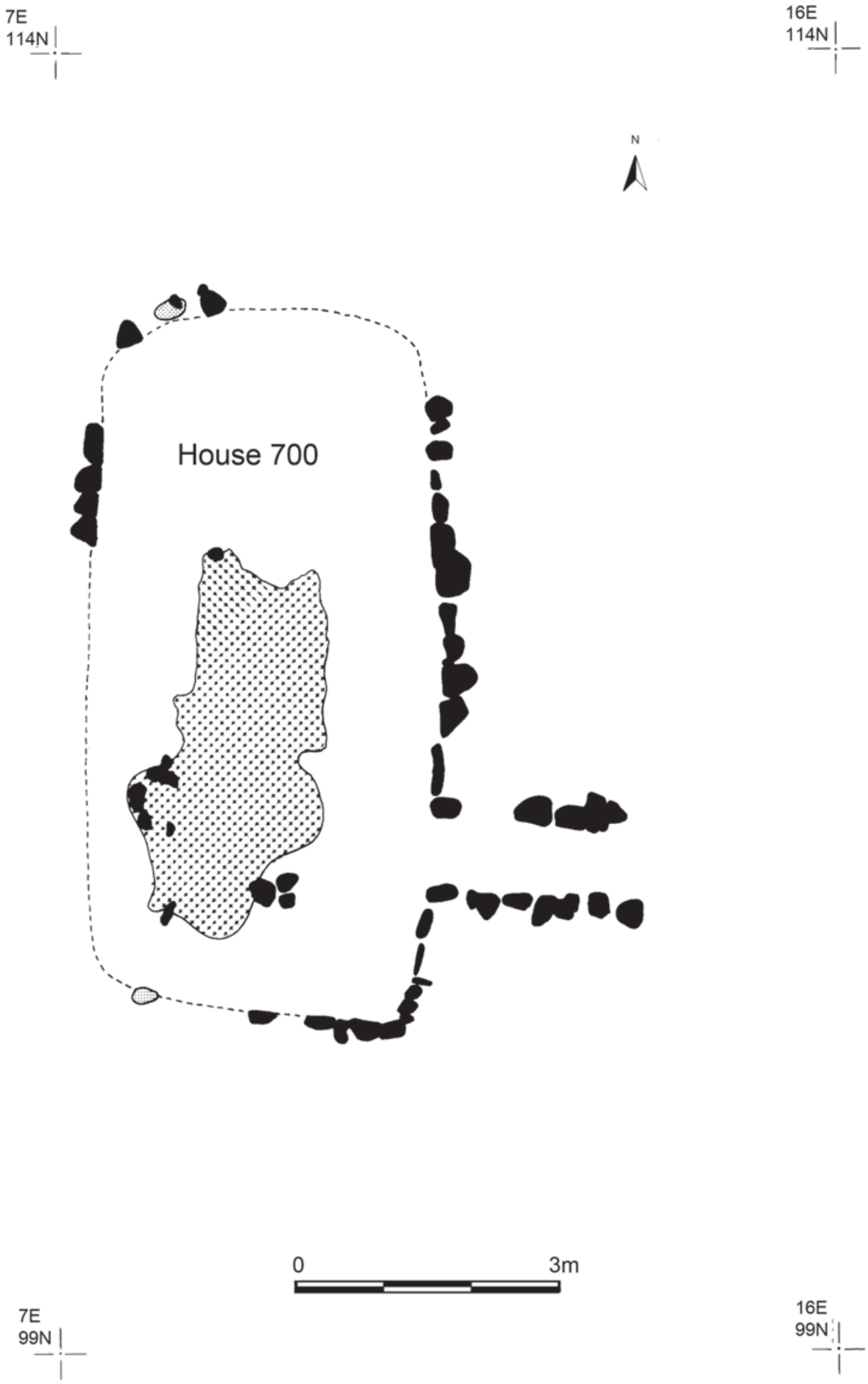


Figure 5.1. Simplified plan of House 700, showing the hearth and walls

The floor of the house was a compact, dark brown organic sand (701), with a maximum depth of 0.05m to 0.10m, thinning and becoming patchy at the edges towards the walls (Figures 5.3–5.4). Two pieces of *Betula* sp. charcoal from the hearth within layer 701 produced radiocarbon dates of cal AD 1020–1220 at 95% probability (SUERC-4901; 910±40 BP) and cal AD 1000–1190 at 95.4% confidence (SUERC-4902; 955±40 BP).

The floor merged into and was contemporary with the central hearth of the house, represented by a 0.05m- to 0.15m-thick deposit of compacted, dark orange and black peat ash (774), with a north–south length of 4.40m and a width of 2.20m (Figures 5.1–5.2). There was no formal stone setting around the hearth and its edges had been trampled into the surrounding floor. It is presumed, as with the subsequent houses on the site, that the floors were regularly swept and cleaned and the hearth ashes removed. The relatively thin and ephemeral nature of the floor and hearth in House 700 may

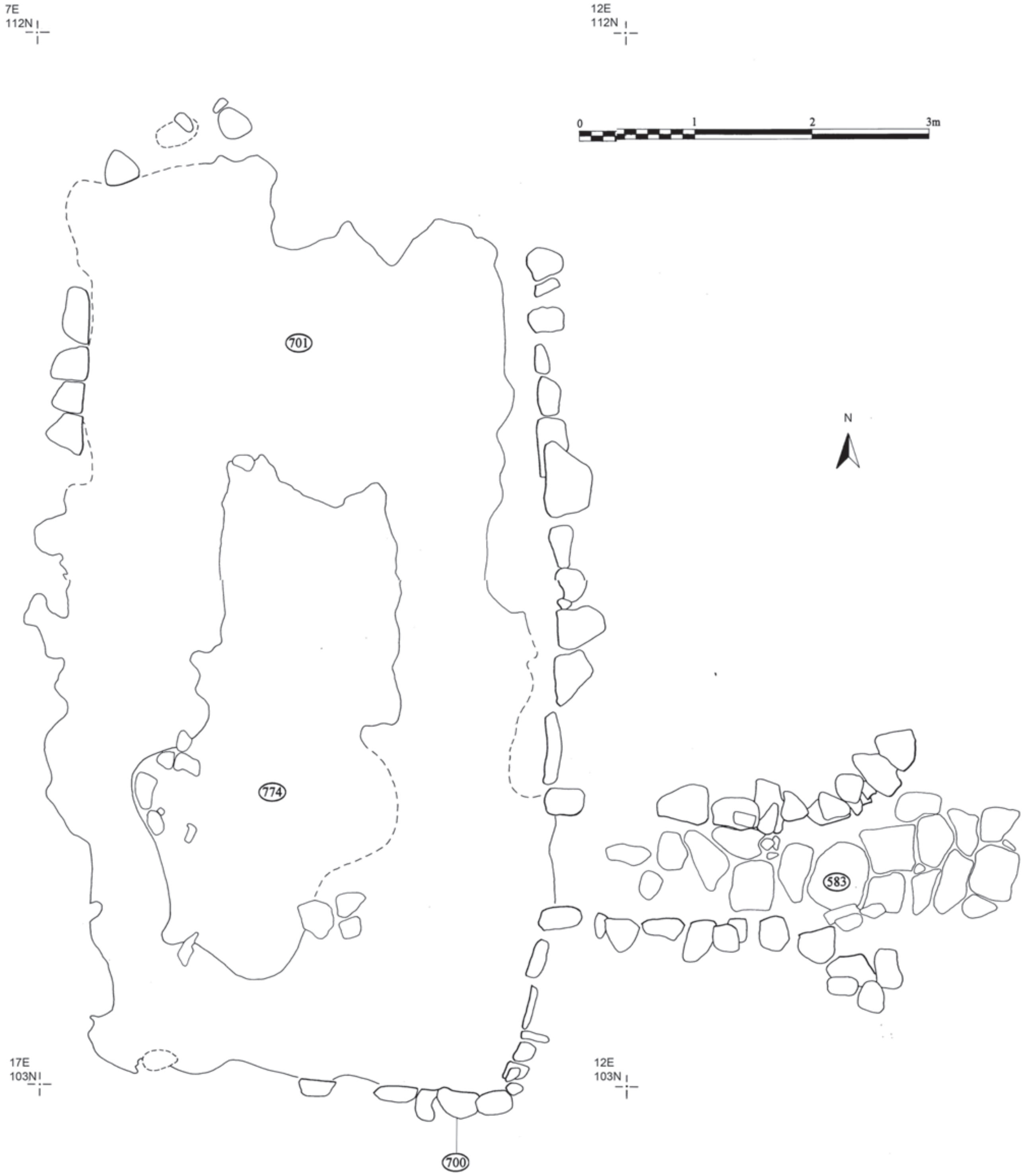


Figure 5.2. Plan of House 700

therefore be indicative not of a short period of occupation but rather of wear and tear affecting the floor.

The floor deposit (701) contained a near-complete antler comb with all but three teeth missing, as well as pins of copper alloy, bone and iron, bone points, numerous iron objects, stone tools (for SF numbers, see Table 5.1) and two pieces of metalworking slag. One of the pins (SF 2152) is pre-Norse, of Late Iron Age type dating from the seventh century onwards. Its presence in the Norse-period longhouse opens the question of who curated it, whether as an inherited or found item.

Within the entrance passageway a dark brown organic sand (568) accumulated over the paved stone surface (583) laid onto the undisturbed white sand. This earliest accumulation of material over the paving appears to be contemporary with floor 701, although stonework acting as a crude threshold within the doorway prevented the two layers being linked stratigraphically.

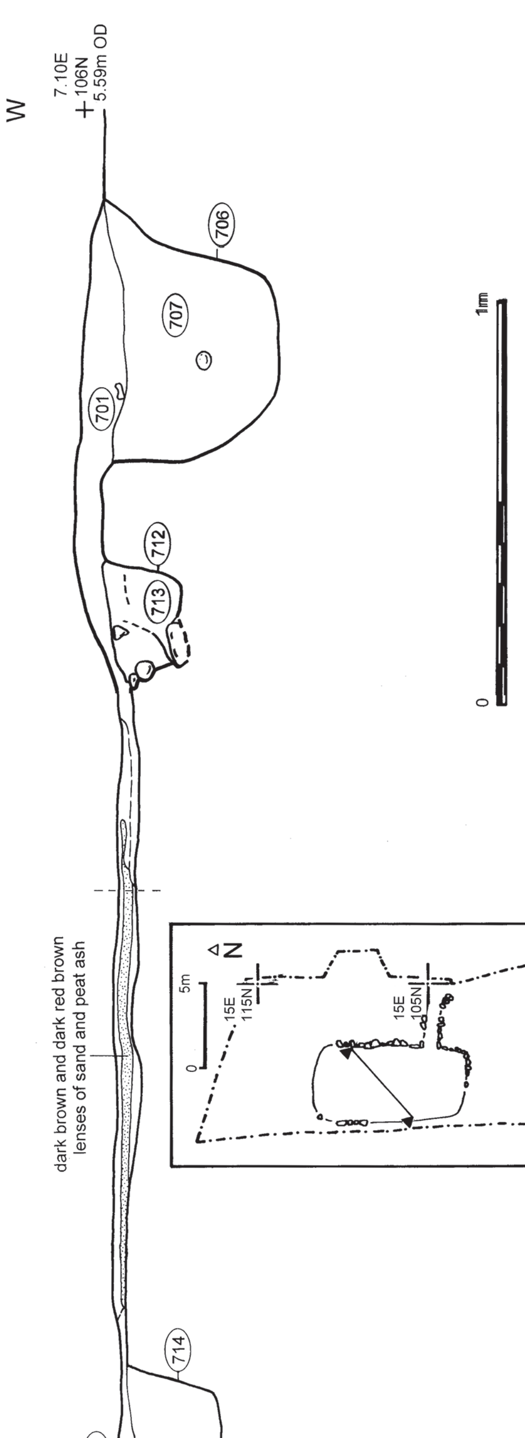


Figure 5.3. Section through the floor deposits of House 700 with earlier pits beneath the floor

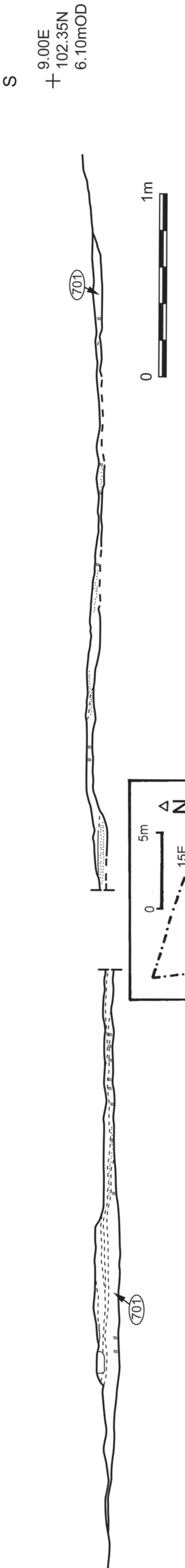


Figure 5.4. North–south section through the floor of House 700

5.2 The spatial patterning of debris within the house floor

M. Parker Pearson, H. Smith, H. Manley and P. Marshall

There was no evident stratification within the house's thin floor layer (701) and so the deposition of material could not be phased or properly differentiated by depth. The materials recovered allowed us to examine distributions of sherds, animal bone fragments, lithics, coprolites (of dogs and cats), complete and broken artefacts (of bone, antler, stone and metal), carbonized plant remains and values of phosphorus, nitrogen and magnetic susceptibility. One of the significant correlations in spatial patterning of different materials is the use of the northeastern corner of the house, and the northern end of the long north-south hearth, as a cooking area or 'kitchen' (see, for example, various plots of nitrogen levels, pottery [<10mm] and animal bone in Figure 5.5).

Sediment analysis of phosphorus, nitrogen and potassium in floor layer 701

In order to maximize the potential for comparison between floor layers at Cille Pheadair and between machair sites of South Uist more generally, the same sampling procedures for geo-chemical investigation (Smith *et al*. 2001) were employed at Cille Pheadair as at the nearby sites of Bornais (Smith and Marshall 2005; 2012; Sharples forthcoming), Dun Vulan (Marshall and Smith 1999) and Cladh Hallan (Parker Pearson *et al.* in prep.). Floor layer 701 was sampled comprehensively at 0.50m intervals using the site grid. Small 'spot' samples were collected at 0.50m intervals on the site grid, at the intersections of the bulk flotation sample squares (see below).

Magnetic susceptibility

Mass specific magnetic susceptibility (χ) was measured at low frequency using a Bartington MS2 meter and MS2B dual frequency sensor (following the method of Gale and Hoare 1991), with results expressed as ($10^{-8}m^3kg^{-1}$).

The results show a high concentration in the southwestern area of the house, and other raised values along the line of the hearth and on the south side of the doorway (Figure 5.5).

Elemental analysis methodology

Elemental analysis was undertaken by ICP-OES at Bournemouth University, School of Conservation Sciences, for total phosphorus (P), nitrogen (N) and potassium (K). The Aquae Regis digest method was used to prepare the soil for analysis. Three replicates were measured, each weighed into acid-washed test tubes, and the weights recorded. Methods broadly follow McGrath and Cunliffe (1985) with modifications. To 0.25g of soil, 9ml of 36% hydrochloric acid and 3ml of 70% nitric acid were added. The samples were then left to cold-digest in a fume cupboard for 3 hours. Afterwards, they were placed in heating blocks at 60°C for 6–8 hours, then at 105°C until the acid evaporated to leave dry soil. At this stage the tubes containing the dry soil were re-weighed and the dry weight recorded.

Samples were re-suspended by adding 3ml of 25% nitric acid and placing the samples back in the heating blocks for 20 minutes at 60°C, subsequently adding 12ml of analytical grade water and heating again at 60°C for another 30 minutes. The samples were then left to cool before being re-weighed for the final time. All the samples were then filtered through Q210 filtration papers prior to being dispensed into clearly labelled auto-sampler centrifuge tubes. A standard solution for calibration of the ICP was prepared prior to the samples being analysed, and quality-control blanks were inserted every 20 samples. The samples were then analysed using the Varian Vista-PRO Axial ICP-OES. Trace element results are quoted in ppm. Precision values (calculated against certified soil standards) range up to ± 10%.

Total phosphorus

The results show high concentrations of over 3,000 ppm along the north–south hearth, towards the wall on the hearth's east side, along the north end of the house, and within three restricted concentrations within the south end of the house (Figure 5.5). The enhanced levels around the hearth and at the north end of the house are consistent with the accumulation of waste from fuel and from food during its cooking and consumption.

Nitrogen

High nitrogen values of over 1,000 ppm are found in five main concentrations in the northern half of the house (Figure 5.5). These mostly correspond with areas high in total phosphorus except for the concentration close to the house's northwestern wall.

Potassium

High values of over 1,000 ppm are restricted to the hearth, the north end of the house and the southwestern corner of the house, mirroring many of the areas with high phosphorus values (Figure 5.5).

Overview

The combined results show strong patterning in the chemical and physical properties of floor layer 701, especially within the hearth area and at the north end of the house where further analyses indicate that cooking activities were undertaken (see below). These results are consistent with those of similar studies around hearth and cooking areas both in South Uist (Smith and Marshall 2012: 69–73) and elsewhere (Jones *et al*. 2010; Wilson *et al*. 2005).

Methodology for flotation sampling of house floors

The floor layers of the house were completely sampled on a 0.50m by 0.50m grid (see Smith *et al*. 2001). The large

sample was transported to a water separation/flotation tank (Kenward *et al*. 1980) where light material was collected as coarse and fine fractions (1mm and 300μm mesh sieves) and the heavy material as residue (>1 mm).

The residues were transported to Bournemouth University for further analysis. All heavy residues were passed through a 10mm mesh sieve and the artefactual and ecofactual material was removed, the numbers counted and the material bagged by finds category. Heavy residues selected for further analysis were first sieved through a 0.50mm mesh to remove fine dust particles and then sub-sampled for detailed analysis.

The sub-sampling was done using a riffle splitter, which creates samples by systematically halving the residues, creating fractions of 0.5, 0.25, 0.125, 0.0625 *etc*. The splitting was designed to reduce the residue to a size that could be sorted and recorded in about two hours. The sub-sampled residue was then examined systematically and all the material that was not stone or seashell was removed. The various categories of finds were counted and then bagged for subsequent analysis by specialists.

Ceramics

Numbers of ceramic sherds >10mm were very low, and most 0.50m sample squares produced no more than two sherds. The distribution was not even across the floor (Figure 5.5). The highest concentrations lay in the southern half of the house in the hearth and the doorway. There was also a light scatter in the northwestern area of the house. Three squares from this area produced six conjoins, the only joining sherds found in the whole floor layer. This suggests that there was least disturbance of broken cooking pots in this northwestern area.

Fragments of sherds <10mm in size were similarly few, most of them concentrated in the eastern edge of the north wall (Figure 5.5). A lighter concentration lay along the northern part of the west wall.

Clay

There were seven findspots of clay lumps from the house floor (701) and hearth (Figure 5.7). Two lay within the hearth (774) and the remainder came from its northwestern edge. All were small and in a variety of brown, buff and grey colours with only one buff lump (from the southern end of the hearth) containing grits. Most potting clay found at Cille Pheadair is a grey-green colour with gneiss grits, and this buff shade might have been caused by heating. Conceivably, the stoneless clays found northwest of the hearth could be residues from potting but the lack of temper suggests another set of activities.

Animal bone fragments

Bones >10mm were primarily distributed in the northern half of the house, with concentrations east of the hearth and in the house's northwestern corner (Figure 5.5). This contrasts with the ceramics, since most of the sherds of this size (>10mm) are in the southern half of the hearth and in the doorway area, the latter perhaps derived from routine sweeping of debris towards the doorway.

Small fragments of unburnt mammal bones <10mm exhibit a concentration between the east side of the southern end of the hearth and the doorway, Two lesser concentrations lay in the northeastern corner and the middle of the west wall (Figure 5.5). Small fragments of burnt mammal bones <10mm are concentrated between the hearth and the doorway like the unburnt bone (<10mm), but the densest concentration of burnt bone is in the northwestern corner of the house (Figure 5.5).

The distributions of bone and pottery both suggest patterns of sweeping towards the doorway. Butchery or discard of large pieces of bone may have occurred north of the hearth, with sweeping debris of all bones collecting against the walls and in the corners.

Small mammals

The remains of a minimum number of three small mammals were found within floor 701. Near-complete remains of two individual skeletons within single squares suggest that these died in the house and remained relatively undisturbed against the south and west walls, close to the walls' midpoints (Figure 5.7). The remainder of the bones of small mammals (>10mm), numbering 1–4 bones per square, were scattered along the western edge of the house, in the 'sweeping debris' zone by the door, and in the concentration of sherds and other artefactual debris north of the hearth. When considered in terms of numbers per litre of soil, rather than absolute numbers of bones, the remains of small mammals reveal concentrations in the northwest and to the west of the hearth's south end (Figure 5.5).

Only one of 98 bones showed evidence of having been ingested and regurgitated within an owl pellet (see Chapter 18); in this context, the small mammal bones cannot, therefore, provide compelling evidence for the presence of owls and thus any long-term period of abandonment between phases 3 and 4.

Fish

Floor deposits in House 700 produced a greater proportion of caudal vertebrae belonging to cod and pollack than of those from the abdominal region, in contrast to midden material. The majority (83%) of the <10mm material came from the floor of House 700 (701). Herring dominate this sample. The spatial distribution of unburnt fish bone shows a concentration in the southern half of the hearth and a lesser grouping northeast of the hearth (Figure 5.5). In comparison, the distribution of burnt fishbone is within the hearth, especially within its northern end, and also around the south side of the doorway (Figure 5.5). This latter concentration is suggestive of a pattern produced by sweeping debris towards and out of the doorway, with some of it failing to be expelled in the doorway area.

Table 5.1. Phase 3 non-ceramic artefacts by context and context type

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 3				
Floor deposit	701	2151	fragmentary single-sided composite comb with all but three teeth missing	13.1
		2150	round-headed copper-alloy stick pin	13.15
		2152	acorn-headed bone pin	13.10
		2275	iron ringed-pin	
		2173	bone point	14.2
		2689	bone point	
		2690	bone point	
		2803	bone point	
		2154	perforated whale vertebra	
		2758	stone smoother	
		2759	fragment of stone polisher	
		see Chap 15	iron chisel, clench nails, nails, roves, fittings, strip, plate fragments, unident. fragments	
Northeastern midden	319	1127	very worn single-sided composite comb fragment of probable reindeer antler	13.1, 13.6
		1871	single-sided comb end-plate	13.1
		2014	bone pin	13.10
		2800	bone point fragment	
		2801	bone point	
		2705	worked antler tine	
		1526	possible bone pin fragment	
		see Chap 15	iron knife tang, clench nail, nails, roves, pierced fitting, binding, plate fragments, unident. fragment	
	320	1697	bone pin-beater	
		1924	fragments of decorated gold strip	13.24, 13.25
		see Chap 15	iron cauldron lug	
	324	see Chap 15	iron nails, clench nail	
	328	see Chap 13	triangular silver fragment from the rim of an uncertain coin ?10th century	
		1305	fragmentary end-plate from a single-sided comb	13.1
		1202	smoothed cut-marked bone fragment	
		1196	socketed bone point	
		see Chap 15	iron rove, nail, unident. fragment	
	333	see Chap 15	iron rove, nail, unident. fragment	
	335	see Chap 15	iron nail, strip	
	336	1223	bone toy spearhead	14.2
	340	see Chap 15	iron nail, unident. fragments	
	432	see Chap 15	iron clench nail, rove	
	454	2197	fragment of a side-plate from a single-sided composite comb	13.1
		see Chap 15	iron clench nail, rove, unident. fragment	

Table 5.1. continued

Eastern midden	425	2035	bone pin	13.10
	433 *(wall)*	see Chap 15	iron nail	
	443	see Chap 15	iron roves, nails, unident. fragment	
	459 *(wall cut)*	2183	notched, cut and grooved bone fragment	14.3
		see Chap 15	riveted iron strip, clench nails, nails, roves, plate fragments	
	462	see Chap 15	iron clench nail, unident. fragments	
	464	2020	whale vertebra tool	
	465	2180	comb tooth-plate	13.1
		see Chap 15	iron nail	
	472	see Chap 15	iron rove, nail	
	477	see Chap 15	iron nails	
Southeastern midden	134	see Chap 15	iron nail	
	137	1980	comb tooth-plate	
		2483	comb tooth-plate	13.1
Sandbank fill	528	1717	perforated bone pin fragment	
		2700	bone toggle	13.14
		2708	bone point	
		2733	bone point	
		2748	bone point	
		1853	antler handle	
		see Chap 15	possible iron heckle tooth, probable tool tang, folded clasp, clench nail, nails, roves, plate fragment, unident. fragment	

Table 5.2 Phase 3 non-ceramic artefacts by context from the north room

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 3				
STRUCTURE 353 (THE NORTH ROOM)				
Passageway	387	1767	gneiss stone with black circles	16.1
Windblown sand	351	1544	stone polisher	16.2
		1420	polished circular pebble (gaming counter?)	16.2
	023	1595	stone polisher	
		1596	stone polisher	

Birds

There was a small concentration of bird bone fragments in floor layer 701 midway along the west wall (Figure 5.6). This is probably a sweeping pattern though its distribution does not match that of any other artefact/ecofact category.

Eggshell

Eggshell fragments were distributed principally within two localized areas of the house floor, towards the south end of the west wall and within and east of the northern half of the hearth (Figure 5.6).

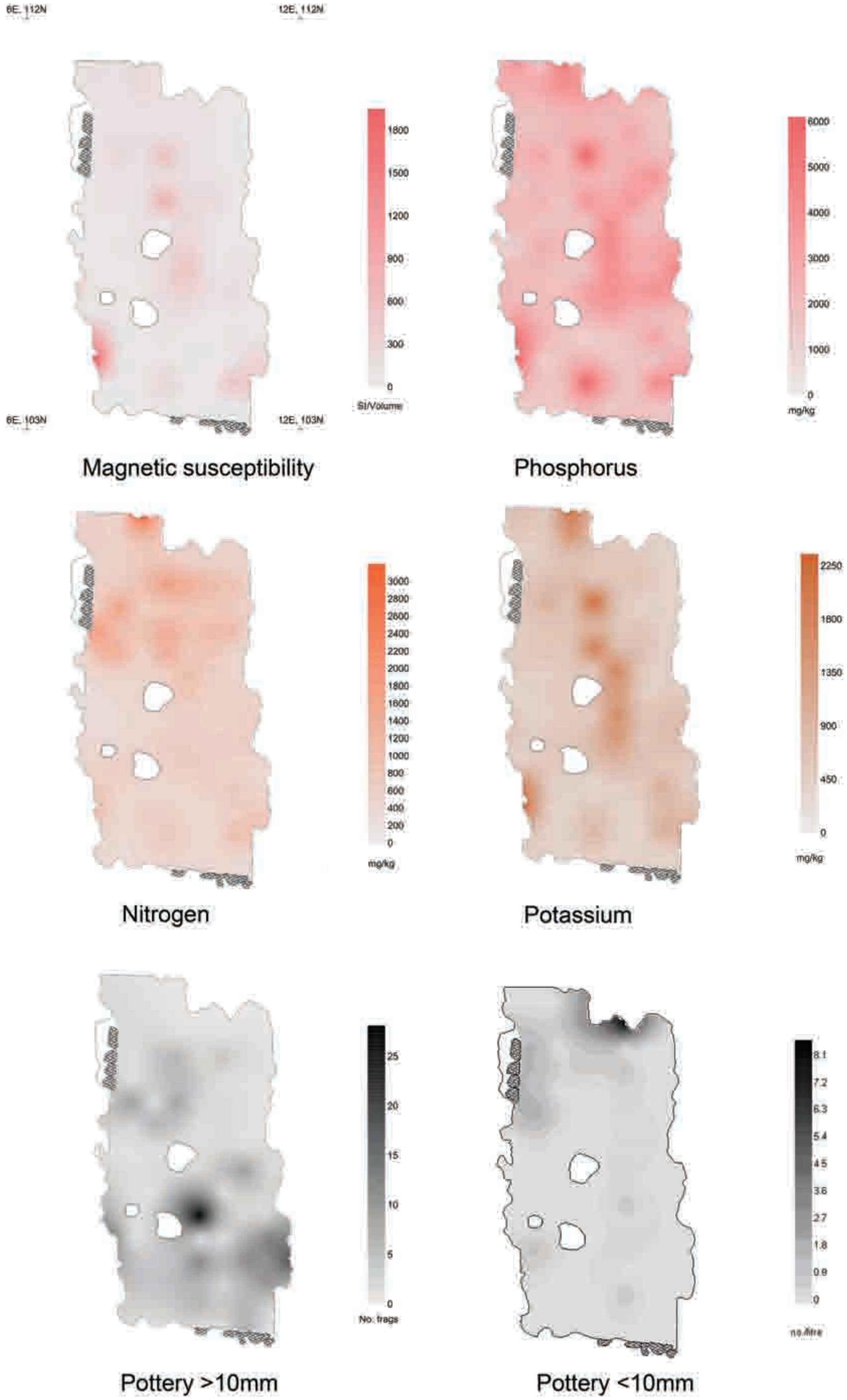


Figure 5.5. The distribution of levels of magnetic susceptibility, total phosphorus, nitrogen and potassium, and of pottery, mammal bones and fish bones in floor 701 of House 700. In this and Figures 5.6–5.9 the three white features are gaps in the floor created by pits cut into it from a higher level (continued overleaf)

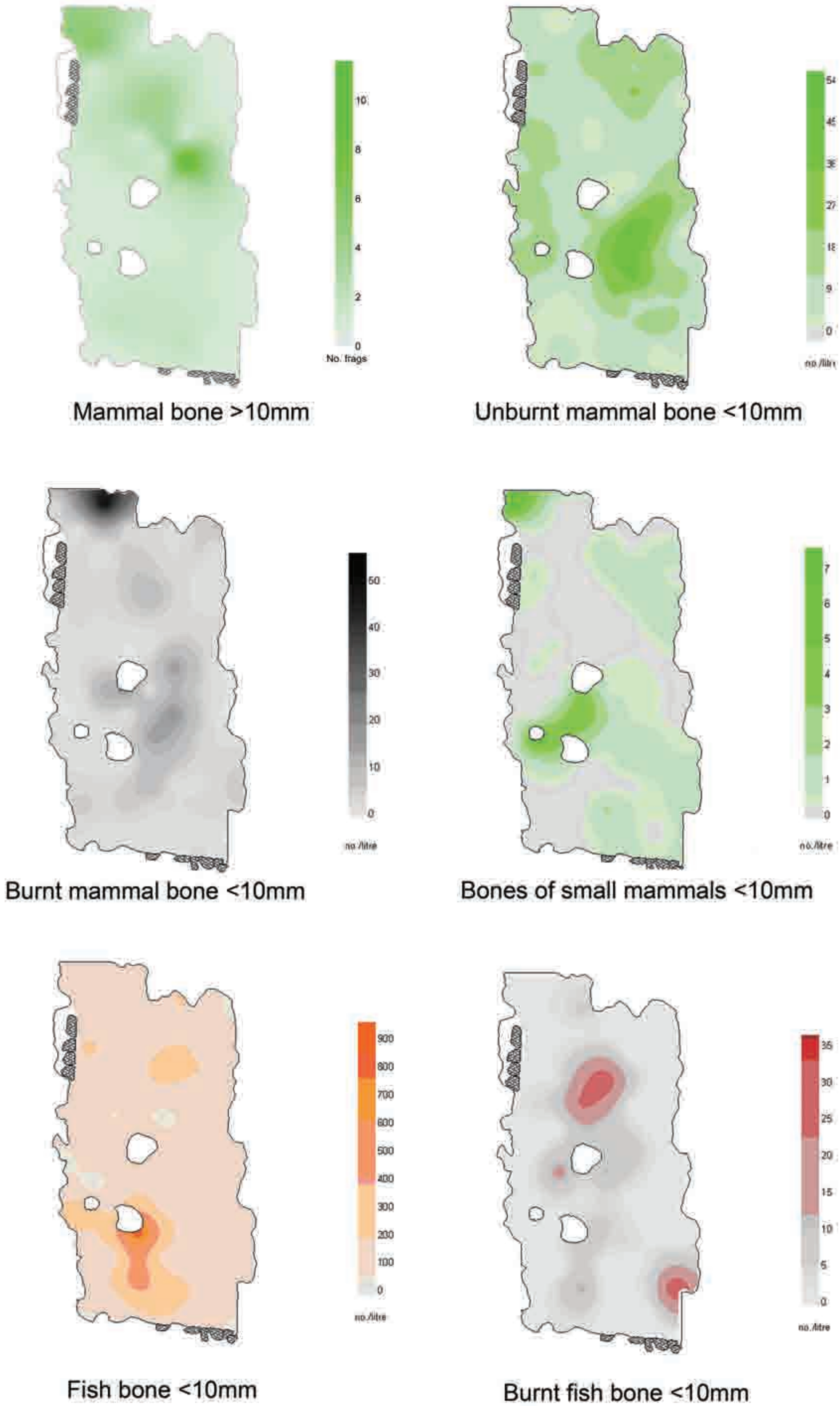


Figure 5.5. (continued from previous page)

Crab/crustaceans

Crab remains were found mainly in three areas of the house floor – in the central southern part opposite the doorway, within the northern half of the long hearth, and in the northeastern corner of the house (Figure 5.6).

Dog and cat coprolites

Within the floor (701) of House 700 were three fragments of coprolite, found against the west wall of the house (Figure 5.7). One is definitely a feline coprolite (from E7.75, N105.25) and the other two may also be the same. Otherwise, the house floor's surface was free of droppings in contrast to surface 620 (phase 2) and other phase 2 fills outside the house to the north. Coprolites also occur within the midden of phase 3 (see below).

Stone

Worked flint

In contrast to the quantities of flint found in later floors at Cille Pheadair, only four pieces of flint were recovered from floor 701, of which just two had been struck (Figure 5.7). Two flakes and one pebble lay within the northern half of the house, near the end of the hearth, and the other pebble lay near the doorway. Most of the flint flakes from Cille Pheadair were produced from strike-a-lights and these two are probably no exception.

Pebbles

Within floor 701, 67 non-flint pebbles were recovered from the heavy residues (Figure 5.8). Most of these were less than 40mm in diameter and could be divided by colour into approximately equal numbers of white and grey, with a handful being black, orange and red. The pebbles were clustered in two areas: in the southeast inside the doorway, and in the northern part of the floor around the end of the hearth. There is a marked absence in the central part of the house and this bimodal distribution may be interpreted as a concentration around the cooking area together with a zone of sweepings towards the door. It thus appears likely that these pebbles were used within the kitchen area, either as some form of decoration, or for recreation, or as a means of conducting and radiating heat from the fire. Unlike the patterns seen in the subsequent house, House 500 (phase 4; see Chapter 6.4), there is no evident spatial patterning of pebbles by colour in House 700.

Slate

Green slate in floor 701 was distributed mostly in the area of the doorway, with a second grouping within the northeastern quadrant (Figure 5.8).

Iron-smithing slag, fuel ash slag and hammerscale

Floor 701 produced just three pieces of metalworking slag, two in the northwestern corner and one from against the west wall where they had presumably been tossed or swept (Figure 5.8). The slag probably derives from the iron-smithing activity that took place from phase 2 to phase 5 east of the house (see Chapter 17). There was a small concentration of hammerscale in the northwestern corner of the house, with another in the centre of the hearth (Figure 5.6).

Fuel ash slag was found in the <10mm residues in small quantities in samples from the southwestern corner of the house (Figure 5.6). It is not associated with metalworking but may be the result of other pyrotechnic activities that created temperatures higher than those normally attained by a domestic hearth.

Bone, antler and metal artefacts

A few bone and antler items were found within floor layer 701 (Figure 5.8). Otherwise, most of the tools and ornaments from this layer were of iron, with a single copper-alloy pin (Figure 5.9). The distribution of these items includes a concentration north of the hearth and along its northwestern side, and a concentration in the south end of the house, beyond the line of the doorway. Few artefacts were recovered from the central area of the house (from the hearth or the areas to its east and west). Two polishing stones came from floor layer 701 but have no co-ordinates or square number with which to identify their exact position in the house.

When analysed in terms of artefact types and degree of completeness, some further patterns can be identified.

Nails

Many more nails than clench nails were found in House 700, suggesting that the occupants installed purpose-made woodwork rather than reusing boat timbers (Figure 5.9). The arrangement of the nails is probably the result of chance discard and sweeping. Although none of the nails is bent, all are incomplete and only two possess their heads. This suggests that they did not fall to the floor as the roof timbers rotted, and we must assume that their distribution across the house was due to other processes.

Iron fragments

The distribution of small iron fragments (<10mm) is most concentrated in the north end of the house (Figure 5.6), even further north than the distribution of metal artefacts (Figure 5.9).

Broken artefacts

Twenty-eight of the iron artefacts from floor layer 701 are broken or unidentifiable. They include two clench nails, two roves, 12 nails, three fittings and nine fragments of strips and plates. Twelve of them were found clustered in the area on the northern edge of the hearth, five were spread along the hearth's northwestern side, and four were in the doorway and the southern end of the house. The latter might have been swept into those positions but the cluster north of the hearth is in the same place as the main

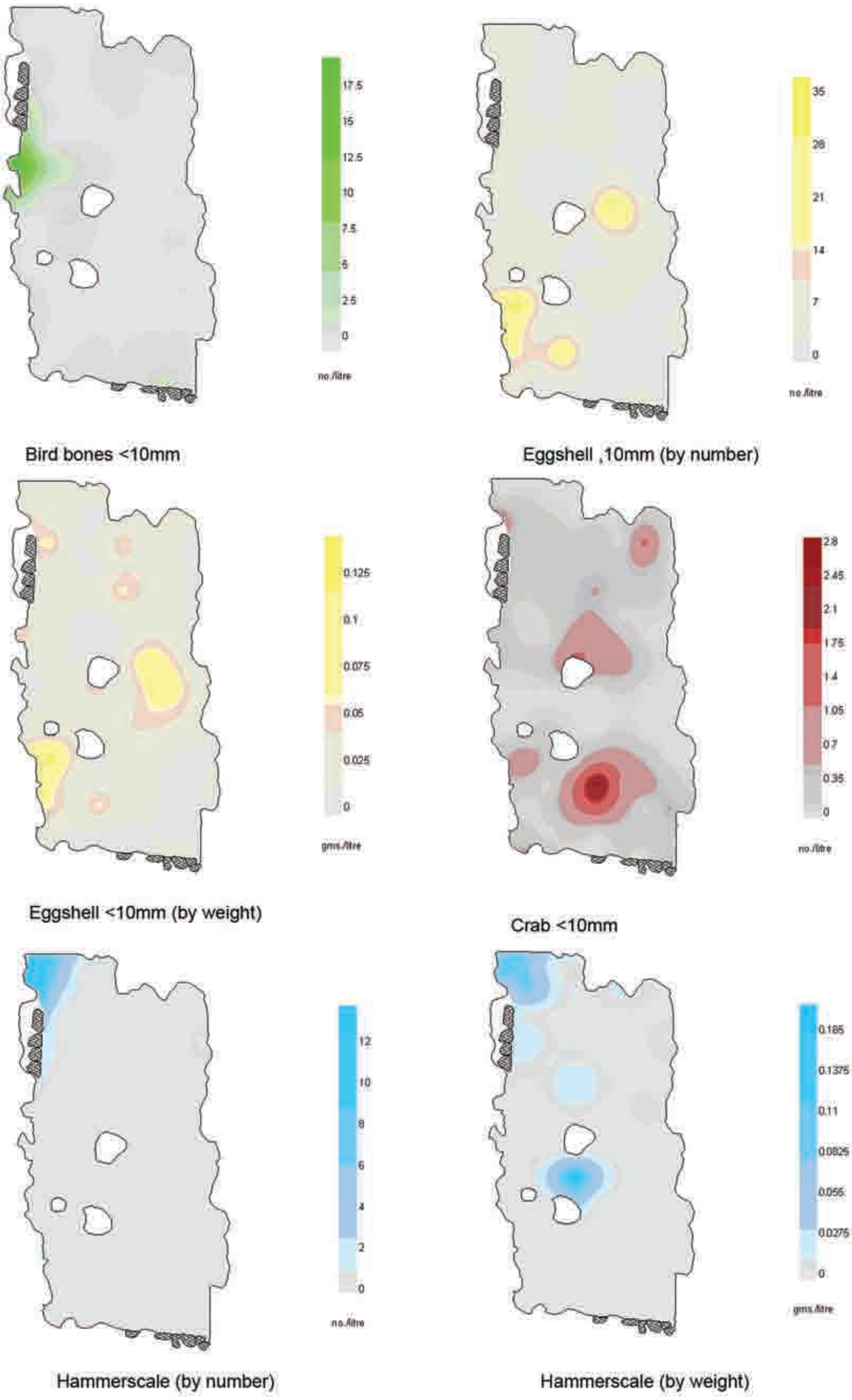


Figure 5.6. The distribution of bird bone, eggshell, crab, hammerscale, fuel ash slag, iron and Spirorbis in floor 701 of House 700 (continued on opposite page)

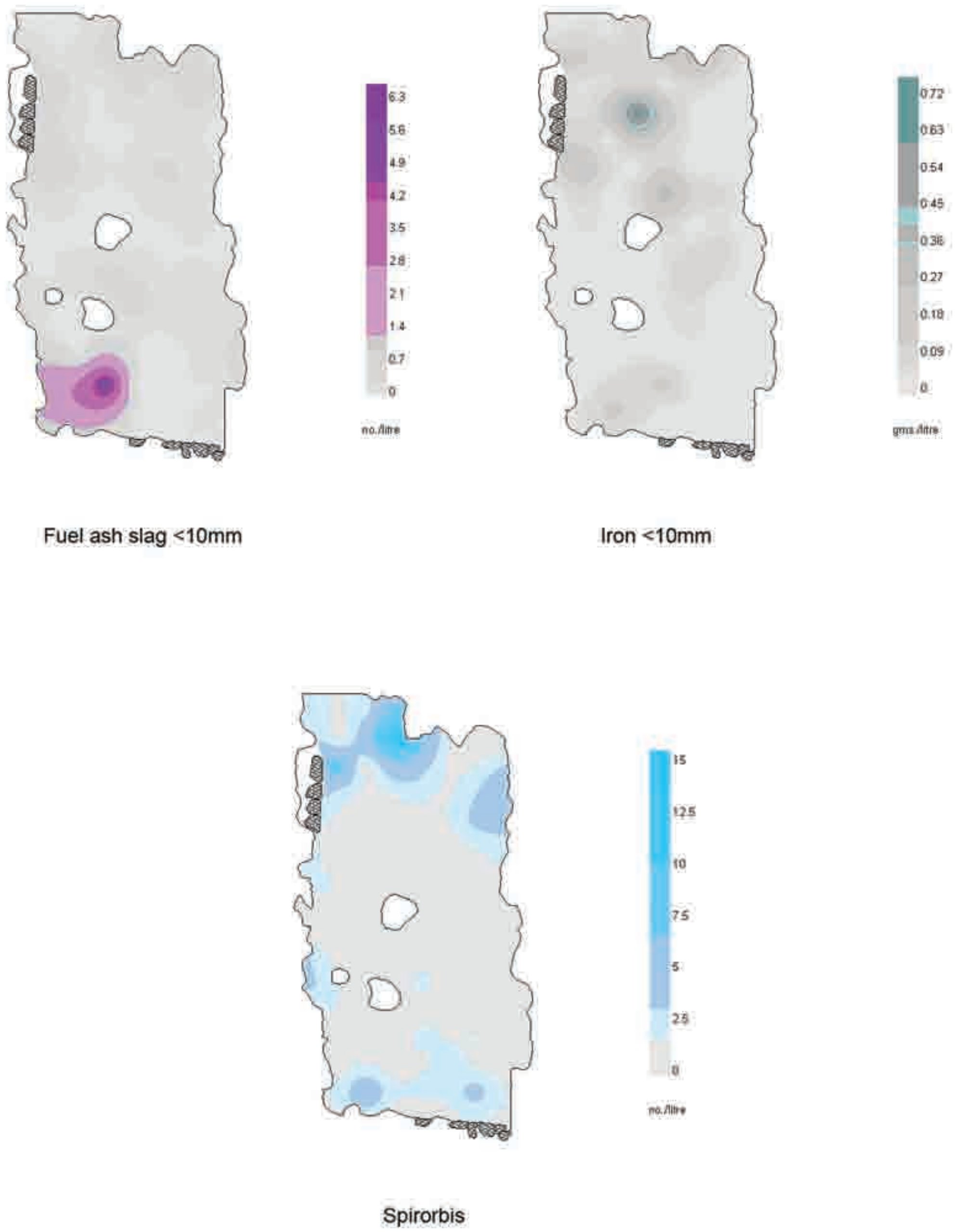


Figure 5.6. (continued from opposite page)

pottery concentration and probably results from burning on the hearth timbers that contained nails and other iron items.

Complete artefacts

The discard of complete artefacts requires careful interpretation. Accidental loss is the most likely explanation for the iron pin (SF 2275) and copper alloy pin (SF 2150) lying against the west and east walls of the house, and perhaps for the iron chisel (SF 2288) in the southwestern corner. Other complete artefacts such as the two bone points found at the north end of the hearth and two close to the east and west walls may be regarded as expedient technology to be discarded whether broken or not.

However, the positioning of a complete bone pin (SF 2152) and an almost complete comb (SF 2151) within the cluster of artefacts and sherds at the north end of the hearth is unlikely to have resulted from accidental loss or haphazard discard (Figure 5.8). The fact that a similar arrangement of comb and pin is replicated in this area of the house in phase 4 (see Figure 6.10) suggests deliberate deposition. This deposition would presumably have been a closing act, as the house floor was abandoned. We may speculate that this was a funerary or commemorative gesture to mark the passing of the person who controlled the household. Not only was her place in the position that provided optimal surveillance of the whole house,

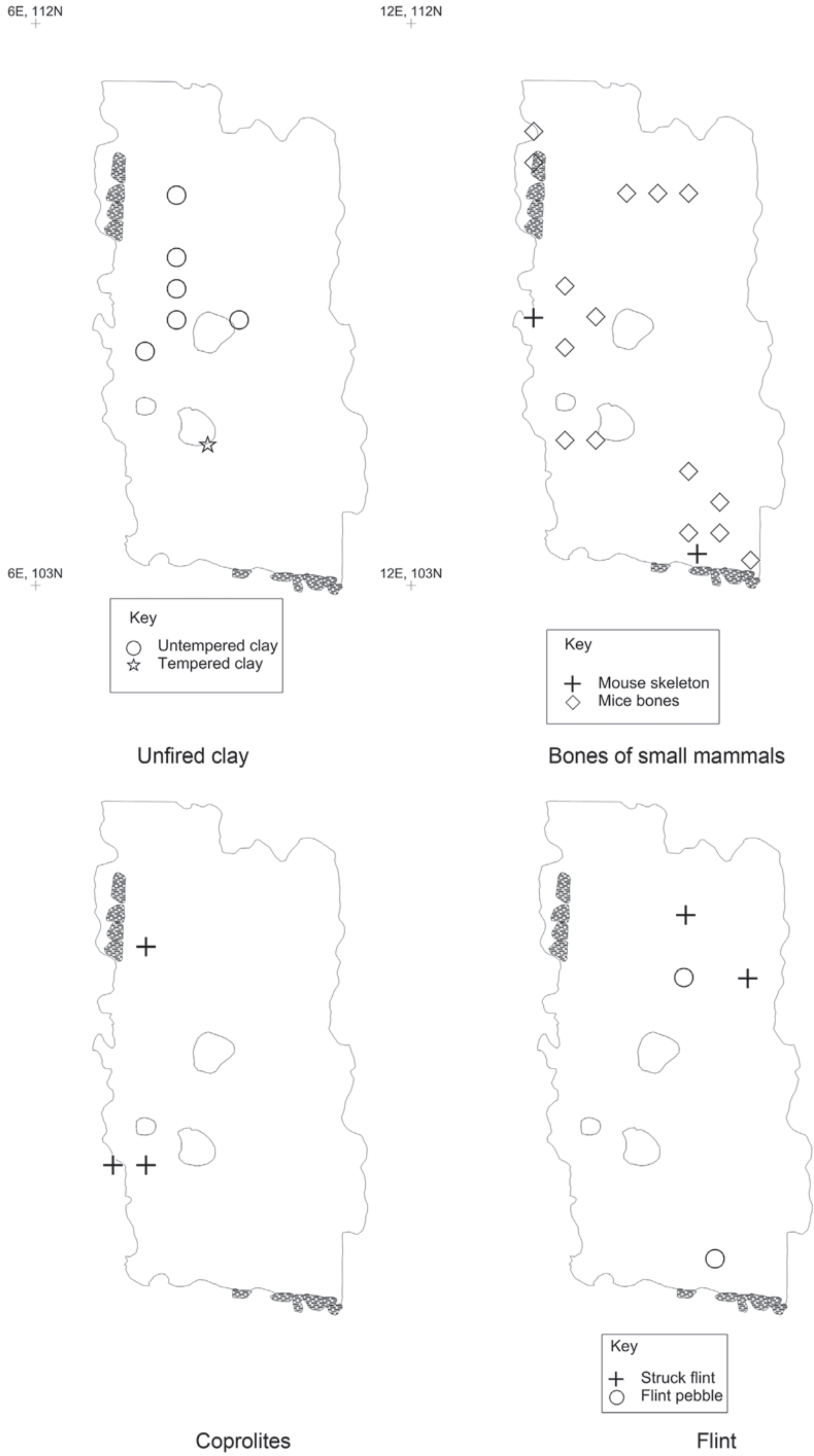


Figure 5.7. The distribution of clay, bones of small mammals, coprolites and flint in floor 701 of House 700

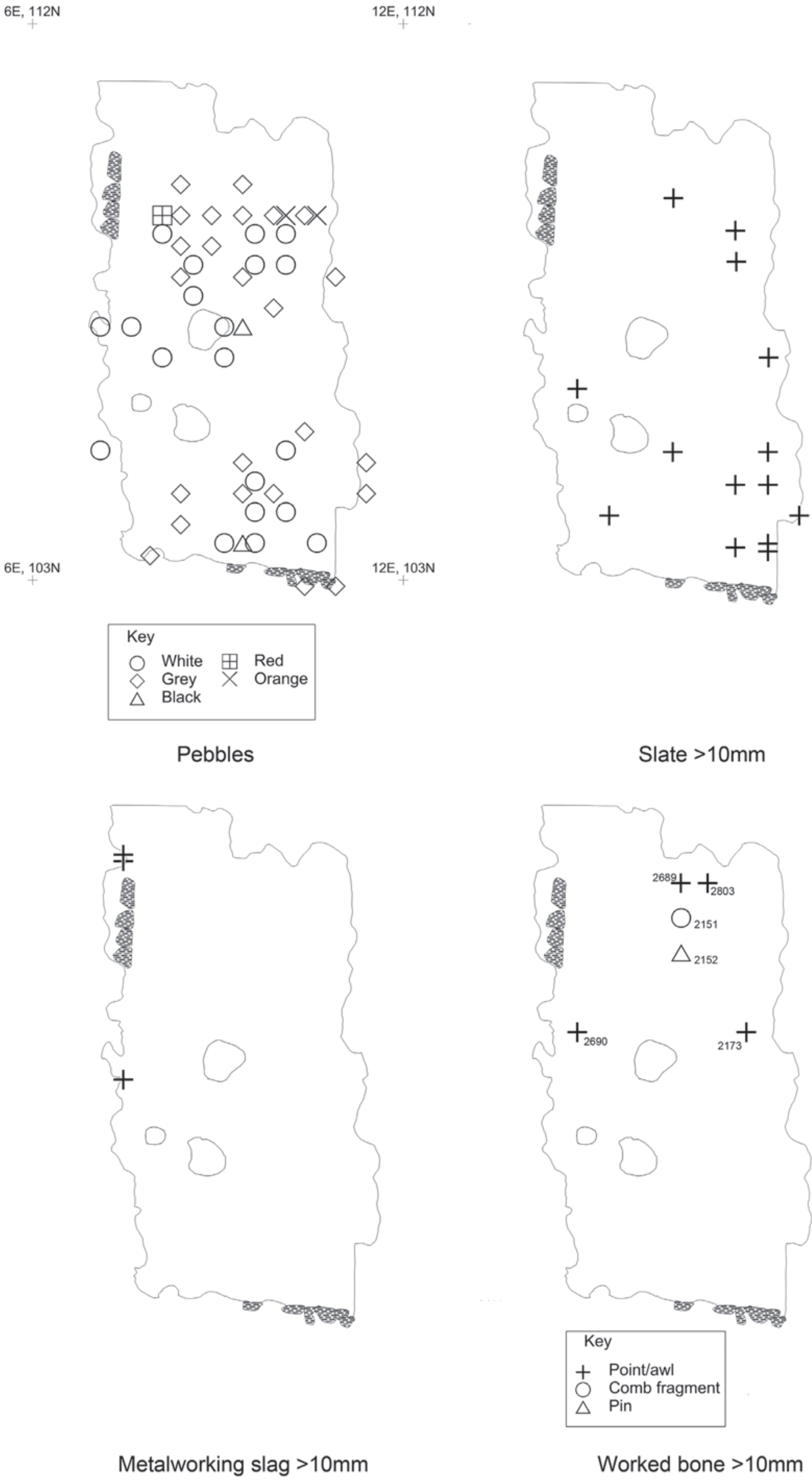


Figure 5.8. The distribution of pebbles (schematic by presence rather than number), slate, ironworking slag and worked bone in floor 701 of House 700

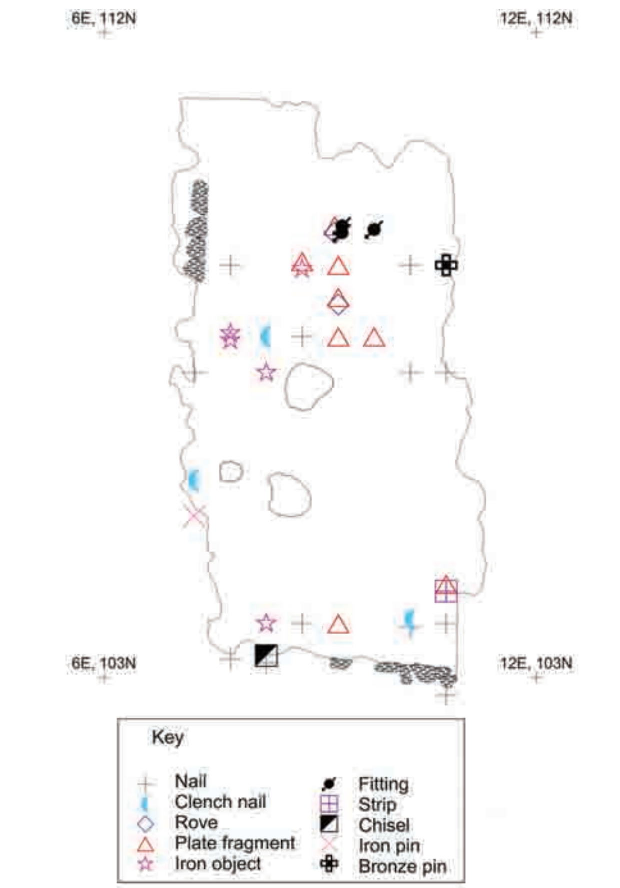


Figure 5.9. The distribution of metal artefacts in floor 701 of House 700

securely located far from the door, but it was also the place of transformation in which food was cooked and raw materials were processed. The woman who controlled this interior was very much the mistress of her dwelling, the 'housewife' whose authority held sway within this domain.

Spirorbis

Remains of *Spirorbis* (<10mm) are mostly concentrated in the north end of the house, especially in the area between the north end of the hearth and the north wall (Figure 5.6). *Spirorbis* is a genus of polychaete worms with a distinctive white coiled shell. These worms usually attach themselves to seaweeds, thus the appearance of their shells in domestic interiors most likely indicates the importation of seaweed into the dwelling as a form of fuel. Traditionally within the Outer Hebrides, certain seaweeds can be dried to form a tinder-like fuel with which to light fires (Smith 2012: 398). The spatial distribution of *Spirorbis* in the north end of House 700 is thus consistent with the storage of dried seaweed for lighting and maintaining the fire.

5.3 Deposition outside the enclosure and the formation of the midden

M. Parker Pearson and M. Brennand

House 700 sat within the sand-walled enclosure, outside the eastern side of which lay midden deposits that can be divided into three groups. The stratigraphic sequence of

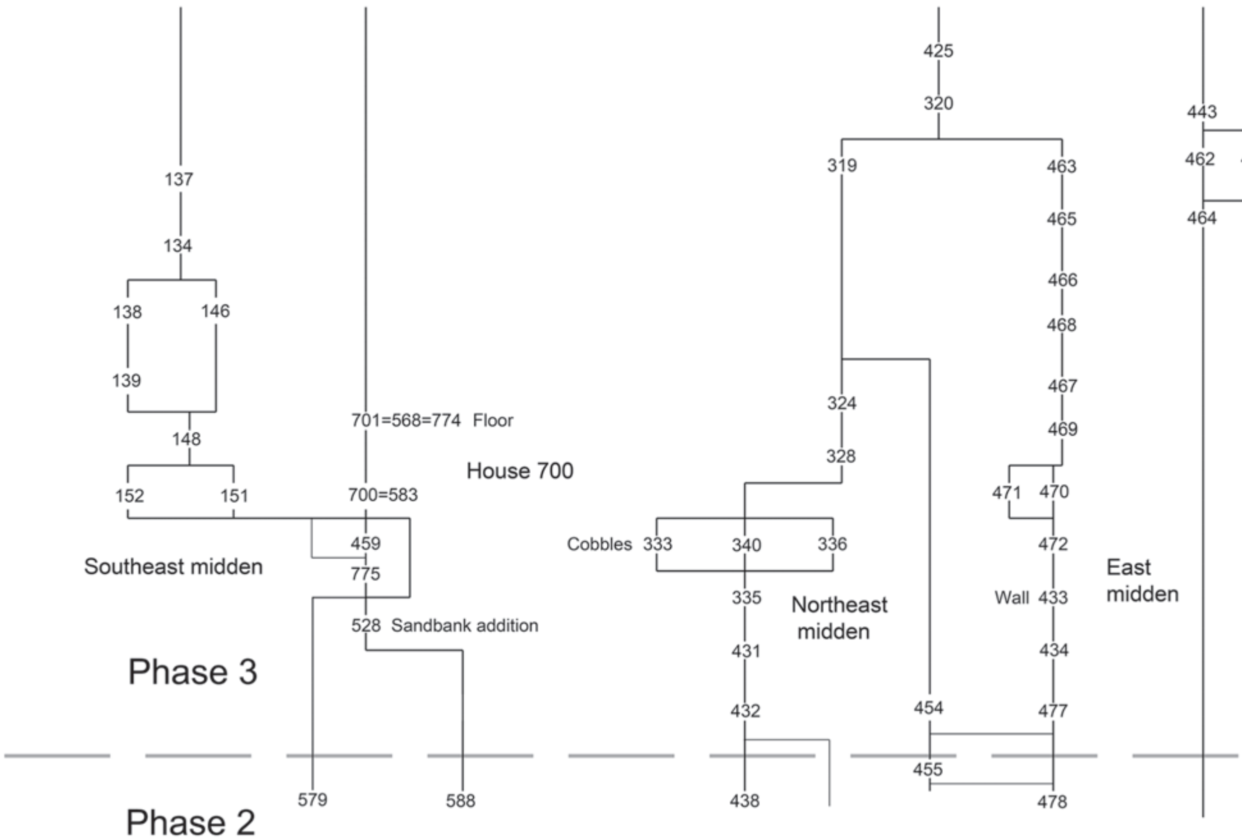


Figure 5.10. Stratigraphic matrix of contexts in phase 3

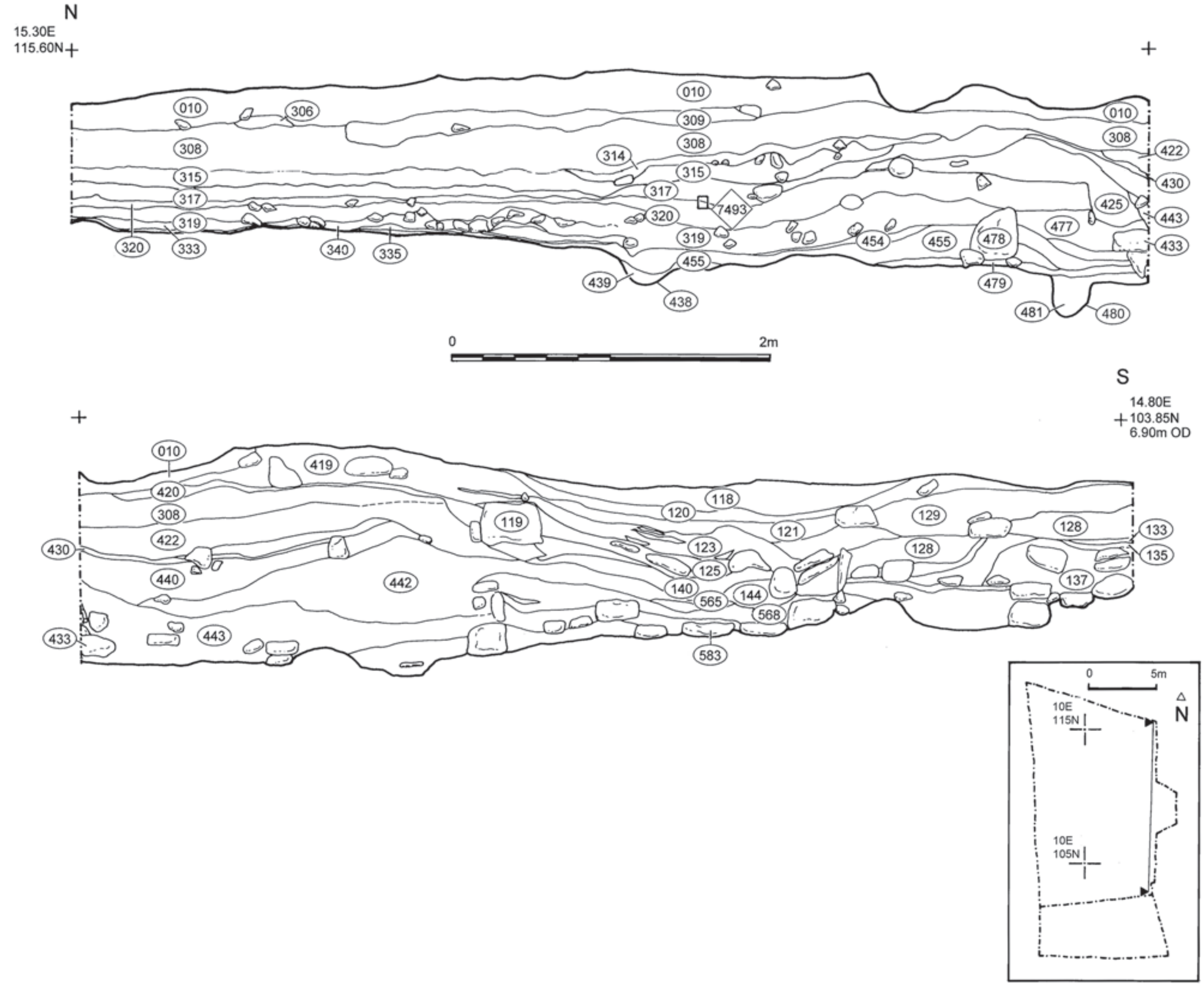


Figure 5.11. Section north–south through the middens along the eastern edge of the site

phase 3 consists of multiple layers both within and outside the house (Figure 5.10).

It was during this phase that the enclosure's entrance was narrowed to accommodate only the entrance passage of House 700. This was done by building a 1.60m-long extension to the sandbank on its northern terminal. This extension was constructed with mixed and mottled white and brown sand (528) and contained noticeably large quantities and large pieces of green slate.[1]

Outside the east wall of the enclosure, to the north of its entrance, a series of deposits developed that were to grow into a midden 1.50m deep (Figure 5.11). The earliest of these deposits and cut features (437, gully 438 and its fill 439, and 455), overlying the undisturbed white sand, are attributed to phase 2. Above them are the phase 3 deposits that form the early stages of the eastern and northeastern midden.

The forecourt of House 700's entrance

There were no floor surfaces or other deposits of phase 3 within this area beyond the doorway other than a small, three-sided rectangular stone setting 0.35m E–W × 0.51m N–S in the northern half of the entrance area, placed so close to the outer revetment wall that its 'missing' west side might never have been built, being structurally unnecessary. This stone setting presumably held a wooden post. The first layer to be deposited on top of it was 442, the earliest midden deposit of phase 4 in this eastern area (Figure 5.11).

The sequence of midden-retaining walls

These earliest layers accumulated to the north side of a succession of east–west retaining walls that were butted at 90° to the sandbank revetment wall (337 and 326). Whereas the latter held the clean sand of the sandbank in place, these smaller walls held back the growing midden to their north (Figure 5.13). As the midden expanded and spilled over each wall, so the next wall was built slightly further to the south. These successive walls enclosed or demarcated an increasingly small clean area within the immediate environs of the entranceway of House 700 (and latterly House 500).

The purpose of these walls was to contain the midden and to preserve an open area in the forecourt of the house.

The earliest of the midden-retaining walls (478, assigned to the end of phase 2), was overlain by 455 (phase 2) and 454, as well as by a slightly organic mid to dark grey sand (477) onto which was built a second east–west aligned wall of turves and unworked beach cobbles (433 with its cut 434; Figures 4.3, 5.11). The stonework of this wall survived to four courses in height and curved slightly towards the south at the eastern end.

The earliest wall (478) was constructed after the second outer revetment wall (326) of the sandbank had been built (in phase 2) and after layer 479 (phase 2) had accumulated against it. Later, in phase 3, a thin layer of grey sand (328) accumulated against the eastern side of wall 326 in the northern part of this eastern midden. The distribution of hammerscale within layer 328 indicates that iron-smithing was taking place on this outdoor surface in this area north and east of House 700's entrance.

Figure 5.12. Revetment walls 326 and 337 on the east side of the sandbank wall, viewed from the north

5.4 The associated middens

M. Parker Pearson and M. Brennand

The earliest midden layers of phase 3 were divided between the northeastern, eastern and southeastern areas (Figure 5.11). Further midden deposits to the northwest, inside and outside the east–west sandbank wall on its north circuit, accumulated during phases 5, 6 and 7, and are described in Chapter 9.

The northeastern midden

In the northeast lay 432, a layer of churned sand, and in the eastern part of this area of midden was 454, a spread of compacted red-brown organic sand with inclusions of bone, shell and stone. An antler comb fragment (Table 5.1) was found in 454. Layer 432, unlike 454 to the south of it, lay directly on sterile sand and was covered by two consecutive layers of trampled and churned white and brown sand (431 under 335). These three layers are provisionally placed within phase 3 although they could very well have been associated with phase 2. Above 335 were three spatially discrete layers:

- 333, a small patch of cobbles set in mid-brown sand containing a fragment of human pelvis (see Chapter 20),
- 336, a patch of light brown/grey sand containing a unique toy spearhead carved from bone (Table 5.1),
- 340, a mid-brown sand, also with cobbles.

All three were sealed by layer 328, which contained a comb fragment, a socketed bone point (Table 5.1) and a triangular fragment of a silver coin, possibly of tenth-century Anglo-Saxon origin (see Chapter 13.16).

Above 319 was layer 320, a light grey sand containing a pin-beater and a decorated gold strip (Table 5.1).The strip, broken in two, appears to have originally been a hair

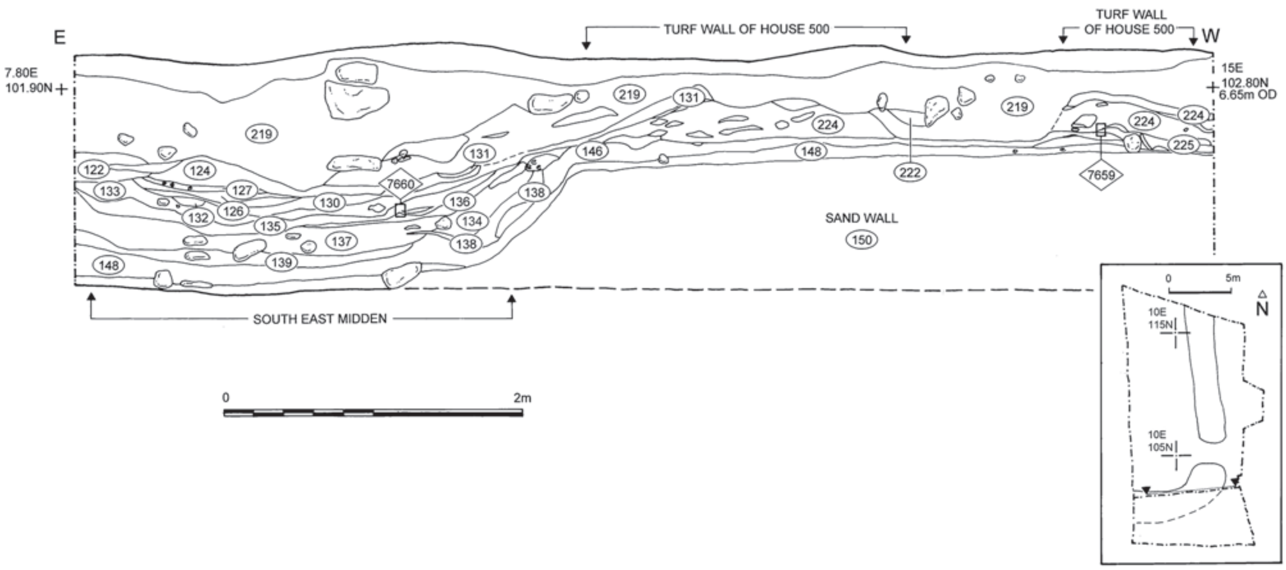


Figure 5.13. The southeastern midden, east of the sandbank enclosure, on which House 500's (phase 4) turf wall was built

ornament but has been bent into a spiral which might have been created by its being wound around a finger prior to its loss or discard. Layer 320 ran through the northeastern and eastern middens (Figure 5.11).

The eastern midden

To the north of the midden-retaining cobble wall (433) was a bank of thin lenses of light and dark sands, formed from decayed turves, mounded up contemporaneously with the stone skin. The bank was constructed of a light grey/brown sand (472) overlain by a white sand (471) and a compacted brown organic sand (470). These were sealed by a white sand (469) overlain by an orange-brown organic sand (467) beneath a white sand (468). This was overlain by a dark brown organic sand (466), itself overlain by a light brown sand (465) containing an antler comb fragment (Table 5.1). Layer 465 was subsequently overlain by dark brown organic sand (463). The north side of the bank was then sealed by the midden layer 320. On top of layer 320, a localized ash spread (425) contained a bone pin (Table 5.1).

To the south, the deposits abutting and to the south of the retaining wall 433 lay directly above undisturbed white sand. The earliest of these deposits was a thin layer of light brown sand (464) with stone inclusions, overlain by a light brown sand (462) with stone inclusions. This deposit was subsequently overlain by a friable dark grey sand (443) with large stone inclusions, interpreted as having fallen from the upper parts of the wall. Layer 443, along with 425 further north, is the latest of the phase 3 midden deposits (Figure 5.11).

The southeastern midden

To the southeast of the entrance passageway of House 700 was a hollow depression or shallow pit-like feature, with its depth exaggerated by the presence of the white sand bank (phase 1) to the immediate west. The build-up of material within this area followed a pattern of deposits of dark organic sands or peat ash, interspersed with layers of windblown sand (Figure 5.13).

Lying on top of the construction cut fill (775) of House 700's south wall and entranceway and on top of the sandbank wall (226 on top of 150=482 [phase 1]) were two grey sand layers (151 and 152) that might have formed from eroded turf. The layer above these was a dark grey, slightly organic sand (148), overlain by a friable grey sand (139) with stone inclusions and, adjacent to it, a light to mid-grey sand (146) with organic sand inclusions. The grey sand 139 was overlain by a thin, compacted layer of black organic sand (138), with charcoal inclusions. Layers 138 and 146 were covered by a dump of dark brown to black organic sand (134). This was sealed by an extensive spread of friable light grey sand (137) with occasional bone inclusions and containing two antler comb fragments.

Dog coprolites in the midden deposits

As discussed in Chapter 4.3, the phase 2 layers in the area immediately north of House 701 contained 16 coprolite fragments and might possibly have been deposited during phase 3 (rather than phase 2).

Many of phase 3's midden layers and exterior surfaces outside the east wall also produced fragments of coprolites: 319, 328, 333, 340, 425, 443, 454, 462, 472 and 477. In contrast, there were only four fragments of coprolites from the remaining contexts of phase 3, three from the house floors (described above) and one from 528, the extension to the north terminal of the sandbank enclosure's entrance (filled in as far as House 700's doorway passage wall).

5.5 Artefacts and other remains from the house and its associated deposits

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville and C. Ingrem

Fragmentation

There are five groups of contexts in this phase:

- the house floor,
- the sandbank extension,
- the northeastern midden,
- the eastern midden,
- the southeastern midden.

The house floor (701) produced a large assemblage of bones and sherds, in an overall ratio of 4:1. Apart from the almost equal number of sherds to bones in the small assemblage from 459 (probably the fill of the wall cut for the house's east wall), all other contexts from this phase produced very low ratios of sherds to bone (Figure 5.14). In fact, no midden layers produced more than ten sherds from any single context.

The profile for the house floor (701), as might be predicted from the Dun Vulan results (Parker Pearson and Sharples 1999), is characterized by small sizes of bone and sherds, no doubt the result of trampling and removal of the larger fragments. A similar pattern of small bone fragments and sherds was obtained from 528 (the sandbank extension), except that here the ratio of pottery to bone is much lower. This may result from the gathering-up of sand from outdoor surfaces in particular, where bones might have been scattered and trampled.

The middens produced fragmentation profiles that are largely homogeneous within each of the three areas. The assemblages from the southeastern midden are all of medium size and contain either medium-sized bone with no sherds (137, 148, 152), large-sized bone with no sherds (139), or medium-sized bone with very few sherds (134, 138, 146). The only layer from this area with nothing in at all was 151. These southeastern midden deposits lay to the south of the doorway, on the right-hand side as one left the house. Their strangely gritty matrix of cinder

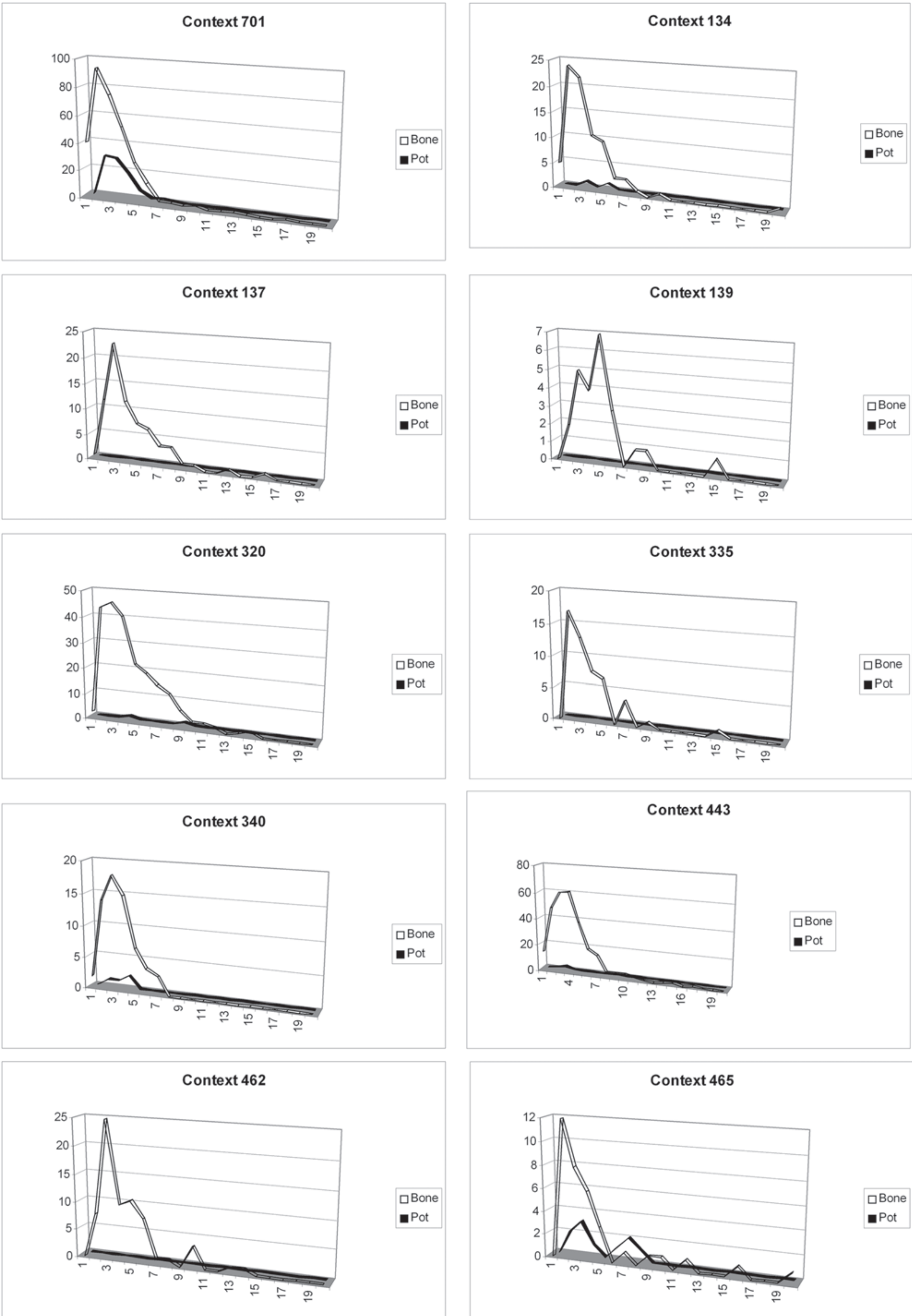


Figure 5.14. The fragmentation of sherds and bones in phase 3 house floor (701), southeastern midden (134, 137, 139), northeastern midden (320, 335, 340) and eastern midden (443, 462, 465)

fragments, differing from the finer soils of the eastern and northeastern middens, was noted during excavation. These deposits south of the door to the house may derive from burnt material cleared from the hearth.

The bone fragments from the northeastern and eastern middens are generally smaller than those from the southeastern midden. The layers of the northeastern midden produced large or medium-sized assemblages of small bone fragments with either no sherds (335, 432) or tiny amounts of either small sherds (328, 340) or medium-sized sherds (319, 320). The remaining contexts either contained nothing (431) or a handful of bones (324, 333, 336).

Many of the layers in the eastern midden similarly contained no debris (463, 466, 471) or a few bone fragments only (464, 467, 468, 469, 470, 472). The remainder of the eastern midden layers contained either small to medium-sized bone fragments and no sherds (433 and 477 [associated with a retaining wall], 454), medium-sized bone fragments and no sherds (425, 462), small to medium-sized bone fragments and small sherds (443) or medium-sized bone fragments with medium-sized sherds (459 [fill of a wall cut]). The only layer in this eastern midden with a fragmentation profile exactly like those of the northeastern midden is 465, with small bone fragments and small sherds.

It is very interesting that each of the three midden areas has a relatively homogeneous fragmentation profile. This suggests that recurrent practices of deposition, leading to midden formation, were carried out throughout phase 3. Particular kinds of rubbish were dumped in particular places. We initially considered the possibility that much of the material in the midden assemblages originated from indoors but there are good reasons for thinking otherwise:

- In the fragmentation analysis, none of the midden layers compares very closely with the floor 701. Only 328 and 340 in the northeast (furthest from the doorway) come close and even then their ratios of pottery:bone are substantially smaller than for floor 701. This arrangement is very different from the fragmentation profiles of the midden layers outside the doorway of the Dun Vulan broch (Parker Pearson and Sharples 1999: fig. 5.14) and suggests that at Cille Pheadair rubbish from indoors was *not* being dumped on the middens but was taken further afield.
- Another alternative is that there were different trajectories for different material. This would presume different priorities for the removal of broken pottery and fragmented bone from the house, though deliberate selection from amongst such small pieces seems perhaps unlikely.

The first scenario – with material from the house being deposited elsewhere – is more plausible, being supported by the fact that the overall quantities of peat ash on the site are not substantial when compared to the contemporary settlement at Bornais (Sharples 2005d; 2012b; forthcoming) or to Iron Age middens such as Dun Vulan (Parker Pearson and Sharples 1999: 97–106). It may be that the rubbish from indoors was taken either off the mound or around to its west side (which was washed away by the sea before the site was excavated). Alternatively, if ceramic use in phase 3 was very low (with more reliance on cauldrons and other metal vessels), then the debris in the southeastern midden could have originated indoors.

Bone, antler and metal artefacts

There is a wide range of artefacts from this phase but they were found unevenly distributed in different parts of the site. The most prolific context was floor 701, discussed in section 5.2 above. The fill (528) of the sandbank extension was also full of artefacts as well as the second highest quantity of sherds (18) from this phase. Artefacts from this context include five bone artefacts (pin, toggle and points; Table 5.1) and a variety of ironwork: a possible heckle tooth, a possible tool tang, a folded clasp and 13 other assorted nails, roves *etc*.

The layers of the southeastern midden were virtually devoid of artefacts. In contrast, the northeastern and eastern middens contained much more material, though the range and quantity are smaller in the eastern midden than in the northeastern area.

- Iron artefacts from the eastern midden were numerous: 14 nails, five clench nails, 15 roves and seven other iron items, including a riveted iron strip, were found in these contexts and are described in Chapter 15. The eastern midden also produced antler and bone artefacts (Table 5.1).
- In the northeastern midden, layer 319 was slightly more finds-rich than the sandbank fill 528 and the range of items in this and other northeastern midden layers is impressive, including the gold strip, the toy spearhead and a large piece of a comb. Iron artefacts were numerous, in similar quantities to those found in the eastern midden: 14 nails, five clench nails, five roves and 12 other iron items, including an eyed lug for a cauldron. Bone and antler finds from the northeastern midden are listed in Table 5.1.

Slag and hammerscale

Large quantities of ironworking slag were found in the eastern and particularly the northeastern midden. Its absence from the southeastern midden is noteworthy. In the eastern midden, layers 459 (fill of wall cut) and 472 contained seven pieces. Within the northern midden, there were nine slag fragments from 319, three from 328, and one each from 324, 335 and 340. Large blocks of slag were found in 319 and 340 and the outdoor working surface 328 contained quantities of hammerscale.

Metalworking was an important activity in phase 3 and was one of the outdoor activities that contributed to the formation of the northeastern and, to some extent, the eastern midden.

Ceramics

More than half of the 154 sherds from phase 3 came from the floor (701) of the longhouse. Interestingly, just two of these were of platter ware which was, in any case, rare in this phase – only another five platter sherds came from the northeastern and southeastern middens. The assemblage is small but it shares most aspects with the pottery from phase 2 and from later phases such as 4 and 5. The numbers of conjoining sherds are, however, lower than in other phases, with only six conjoining within the house floor, seven in the midden and four in the sandbank.

The low level of conjoinability in the house is in marked contrast to that for the floor in phase 4 (see Chapter 6) and suggests that House 700's floor might well have been swept, a conclusion that matches the observations from coprolite distributions (see section 5.2 above).

Clay

A single, small piece of grey clay without grits came from layer 134 within the southeastern midden. It is similar to some of the lumps from northwest of the hearth within House 700. The clay lumps from the house floor were recovered when sorting the residues from the large number of samples taken from the house floor for flotation. Clay from within the midden is, therefore, probably under-represented when compared with house floors, since only single flotation samples were taken from contexts that were not floor layers.

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 3 contexts produced 587 identifiable fragments of mammal bone, an assemblage of similar size to that of phase 2, and the relative abundance of the domestic species in this phase reflects the previous two phases. Sheep/goat are dominant, followed by cattle and pig; cattle is slightly greater in frequency than in the earlier phases. Other domestic species present are goat, horse, dog and cat. Wild species are again present, with red deer limb bones and antler fragments, roe deer limb bones, otter and seal.

Phase 3 deposits produced 4,322 identifiable fish bones, of which the majority is <10mm material retrieved during the flotation programme. The predominance (94%) of cod-family fish, particularly cod and pollack, in the >10mm material is clearly visible. Herring is amongst the >10mm material but only constitutes 2%. Wrasse, cartilaginous fish, eel, flounder and plaice are present.

5.6 Overview

M. Parker Pearson

It is in this phase that we see the first clear evidence of construction and inhabitation of a farmhouse (House 700), along with the development of associated middens outside its east-facing doorway. Of course, we cannot discount the possibility that the features and deposits of phases 1 and 2 were the remains of one or more dwellings within the sandbank enclosure, subsequently largely erased by the construction of House 700 and then, in phase 4, House 500.

The house was built with stone footings beneath the inside faces of its walls, although these were mostly absent from its north end, where the house was more thoroughly dismantled for the subsequent building of House 500. It presumably had a turf wall (seen at the west end of House 500) on top of these footings. There were no signs of postholes or post-pads to indicate the presence of posts acting as internal roof supports; the weight of the roof was presumably supported on the walls. The entrance to House 700 was through the gap on the east side of the sandbank enclosure. This gave access to the southern end of the building. A long hearth stretched down the centre of the house and, on the basis of residues retrieved from within the peat and sand floor, most of the household activities of cooking and food preparation were performed in the northern part of the house, at the north end of the hearth.

There was no trace of any remains of or slots for wooden furniture in the house. It is possible that wooden box-beds would have lined the walls either side of the long hearth (a scenario for which there is evidence in the phase 4 house; see Chapter 6). If this were the case then we might expect the inferred sweeping of the house to have left behind debris accumulated behind bed spaces and other furniture, against the walls and in the corners.

Evidence for domestic activities in this northern half of the house is provided by high concentrations of nitrogen (Figure 5.5), pottery, iron fragments, broken iron artefacts, burnt bones of fish and mammals, and *Spirorbis* (Figures 5.5–5.9) The latter probably derives from seaweed and small driftwood dried for use on the fire. Some or even most of the charcoal from oak, larch, larch/spruce and pine from the hearth probably derives from driftwood whilst the abundant heather charcoal is probably the residue of peat used as fuel (see Chapter 21).

High values of phosphorous and potassium were recorded along the eastern edge of the hearth (Figure 5.5), with raised levels of phosphorous continuing to the east wall, possibly deriving from sleeping areas where infants once wet the bed. High concentrations of unburnt mammal bones, bird bones, bones of small mammals, eggshell and crab were recorded within the central section of the house (Figures 5.5–5.6). Most or all of these are food remains (for humans, cats and dogs). Concentrations of hammerscale in the centre and northwest of the house and of fuel ash slag in the southwest (Figure 5.6) are difficult to explain, but their quantities are very low, possibly deriving from single episodes of deposition.

Activities in the south end of the house are hard to infer from patterns of deposition but the presence of an iron chisel in the southwestern corner hints at woodworking and perhaps other related tasks being carried out. On the basis of practical expectation and lack of much material or physical evidence for specific activities, we can presume that the southeastern

corner would have been an area where clothing and footwear were removed when entering the house.

The concentration of small pottery sherds at the north end of the house indicates that cooking was carried out at the north end of the hearth. Platter sherds are rare, indicating that this method of baking was more infrequent than the boiling of food in cooking pots or iron cauldrons. Some of the broken iron fittings in the floor in the northern half the house may derive from such cooking equipment. A few lumps of raw clay northwest of the hearth may derive from the manufacture of pottery.

The high numbers of potsherds in floor 701 are very much at odds with their small quantities in the middens. This may be because the rate of breakage of pots was highest on the house's abandonment (when pots inside the house might have been broken, the conjoins in the northwest suggesting that sherds in this area were left undisturbed). Alternatively, most cooking on a daily basis was done in metal vessels, so that the midden accumulations rarely contained broken pots. Whatever the case, the composition of the midden deposits varied according to their locations. The southeastern midden might have received indoor rubbish but the northeastern midden was probably supplied from outdoor activities.

As well as cultivating domestic crops such as barley, oats, rye and flax (see chapter 21), the inhabitants of House 700 also kept horses, dogs and cats along with sheep, pigs and cattle. They shared their house with the cats (if not also the dogs) on the basis of feline coprolites in the darker recesses of the longhouse. Whilst cats and dogs would have kept down the mouse population, the presence of natural death assemblages of small mammals within the house shows that the cats did not always eat their mice.

The contents of the middens reveal much about the inhabitants of House 700. The northeastern midden contained some unusual artefacts: a worn reindeer-antler comb (of late tenth to early eleventh-century date) probably imported from Scandinavia, a fragment of a silver coin (probably of tenth-century date) from England, a gold fillet probably used as a hair ornament, and a toy bone spearhead. The comb and coin fragment are much older than the period of the house's occupation and therefore the comb might have been an heirloom; we might envisage that it once belonged to a predecessor of the house's inhabitants, perhaps even an immigrant from Norway. The items of gold and silver may indicate a level of wealth above that of the average farmer.

In contrast, the southeastern midden contained few artefacts; the absence of bone pins and the rarity of comb fragments, together with the fragmentation patterns of its animal bones, indicate that it accumulated from sources different to those of the northeastern midden. The northeastern midden also produced a larger quantity of fish bones.

When the house was abandoned, certain complete items lay on the floor. These included an iron chisel (SF 2288) in the south end, a ringed-pin of iron against the west wall (presumably lying behind a possible box-bed), a copper-alloy stick pin against the east wall, and four expedient bone points in the northern half of the house. Whilst these might have been chance losses in dimly lit peripheries around the interior, other items in more central locations might have been deliberately deposited. A complete bone pin and a comb missing most of its teeth, perhaps signifying the persona of the woman of the house, lay within the food preparation zone at the north end of the hearth. These could have formed a closing deposit to mark not only the end of the house's occupation but also the death of its oldest inhabitant.

Note

1 During excavation this layer was misinterpreted as possibly being the fill of a (non-existent) sub-rectangular flat-bottomed pit [529], and it is therefore recorded as such in the unedited site archive.

6 The second stone longhouse: House 500 (phase 4), constructed *cal AD 1060–1110*

M. Parker Pearson and M. Brennand

with contributions by H. Smith, H. Manley, P. Marshall, C. Ellis, J. Bond, C. Paterson, E.J. Pieksma, J. Mulville, C. Ingrem, P. Austin and J. Williams

6.1 The house and its deposits

M. Parker Pearson and M. Brennand

The southern, eastern and northern walls of House 700 were almost completely demolished when the subsequent building, House 500, was constructed, with only two short stretches and single elements of the lowest course of stone left *in situ* (Figures 6.1–6.2). The stones of House 700's east wall and doorway (at least the basal course) and a length of House 700's southwest wall foundations were incorporated into House 500, but otherwise House 500's walls formed a new build. Presumably most of the stone from the dismantled walls of House 700 was used immediately for the construction of the walls of House 500 and its small ancillary room (Structure 353) attached to the north wall of the main house.

Like House 700, House 500 was oriented north–south. It was also sunken-floored, with its floors (Figure 6.3) lying directly on top of layer 701, the floor layer associated with phase 3 (Figure 6.4). The internal dimensions of this house's main room were 10.30m north–south by 4.90m east–west at its centre. This main room was connected by a short passage at its northern end to a sub-square room (Structure 353), internally 2.30m north–south by 2.80m east–west.

Taking both rooms together gives a total interior length for the longhouse of 14.20m. Its exterior dimensions would have been over 16m north–south and over 7m east–west, assuming walls about 1m thick. With 58 sq m of internal floor space, House 500 was considerably larger than its predecessor, House 700, whose interior was 33.5 sq m.

The paved entrance to the house (Figures 6.5–6.7) was situated at the southern end of the east wall, utilizing the existing entrance passage walls of House 700, albeit possibly remodelled. The doorway led to the outside along a long passageway, 0.80m wide, which ran from the house for a length of 2.50m before opening out into a stone-walled forecourt with a width of 3.20m. The walls of the forecourt ran beyond the edge of excavation to the east, so the full dimensions of the forecourt are unknown.[1]

The main room of the house had slightly bowed walls with rounded corners, whereas the adjoining north room (353) had right-angled corners. The surviving walls of the house were a mixture of randomly coursed, unbonded beach cobbles with large, roughly hewn, triangular blocks in the lower course (Figure 6.8), reminiscent of broch/wheelhouse masonry and possibly robbed from an Iron Age structure nearby. The walls of the entrance passage and forecourt were a combination of wedged, upright, roughly hewn stones and randomly coursed unworked beach stones.

House 500 had two distinct constructional stages. Stage I is described in this chapter and is phase 4. Stage II, when the house was remodelled and shortened, is phase 5 and described in Chapter 7.

At the time of excavation, the walls of House 500 survived to between two and five courses in height but some of these had probably been partially demolished in antiquity to construct internal walls during the house's later phase (Stage II). The western wall of the north room (353) and the northern half of the western wall of House 500 had already been eroded away by the sea when excavation began in 1996 but otherwise the house and its occupation layers were at that time almost completely intact.[2]

Construction deposits

This was the one longhouse for which traces of its organic upper walling were preserved. Whilst stones were used for the interior wall face, the walls were otherwise constructed with turf. The sand fills of the wall cuts contained a number of complete, near-complete and broken items that might have been deliberately placed as foundation offerings (Figure 6.9).

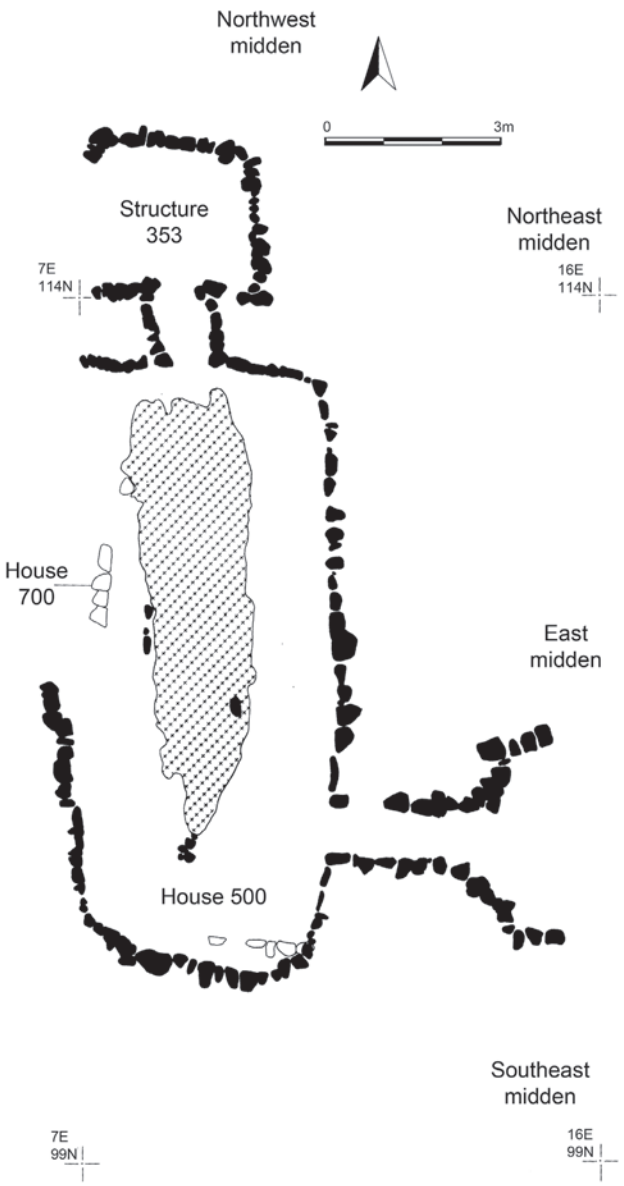


Figure 6.1. Simplified plan of House 500 with its entrance passage, forecourt and north room (Structure 353)

Wall construction deposits

To the northeast, the construction cut for the house walls (545=551=558, filled by 552=578 and stone walls 500=509) truncated an accumulated deposit of mid to dark grey organic sand (459) contemporary with House 700. To the south, the construction cut (545) truncated the surrounding sand bank of white sand (150=226; see Chapter 3). The dark brown sand (552=578) filling the construction cut contained a complete bone needle (Figure 6.9) and a large piece of an antler comb, together with a complete nail and two roves (Table 6.1).

Above the courses of stone walling and the white sand bank at the southern end of the house there was a series of multi-lensed dark grey to black organic sands (225, 224 and 222). Layer 224 is the lowest part of the turf superstructure of the house, with the dark lenses representing the decayed organic turf and the lighter coloured sand representing the machair topsoil that was still attached to the turves when they were cut. This turf wall was the lowest element of longhouse wall surviving on the site. While an extensive turf-built wall would have been constructed on top of the basal stone wall right around the house, later alterations to the house and the construction of subsequent houses have removed all other evidence for turf walls.

The areas to the east and to the west of the walls of the passageway to the north room (353) had been packed with brown sand (384 on both sides and 474 over 475 on the west side). This had then been cut by a wall trench for House 500, containing yellow (557) and dark brown (570) fills. From layer 570, on the east side of the passage wall, came a comb fragment (for SF numbers, see Table 6.1). In the construction fills (384, 474 and 475, outside the walls forming either side of the passageway), were further items (Table 6.1), mostly broken:

- a comb fragment, a bone point and a prehistoric flint scraper in 384,
- a large comb fragment and the tip of a bone point in 474,
- a near-complete ball-headed bone pin and a broken hone in 475.

Figure 6.2. House 500 during excavation, viewed from the east

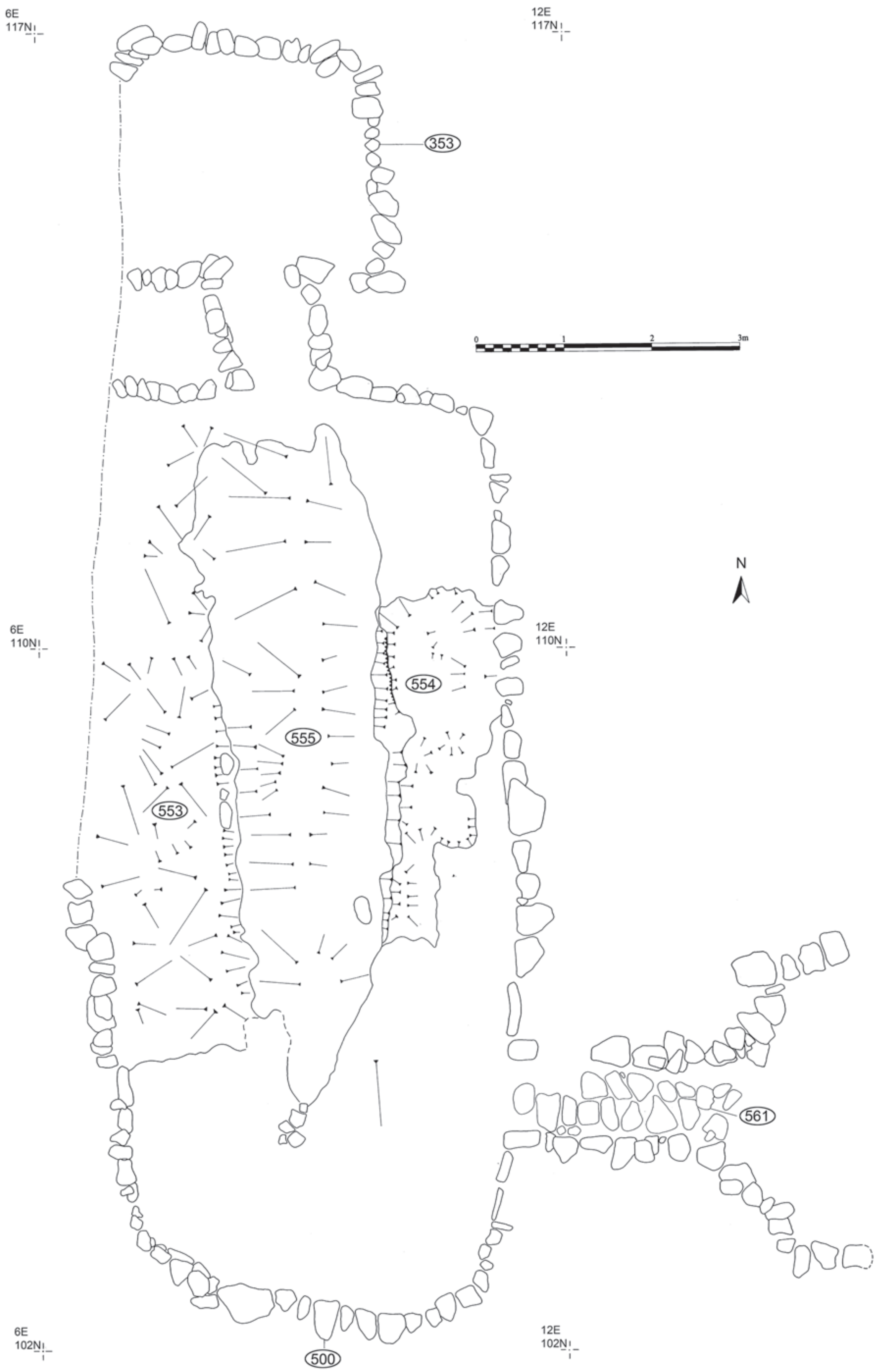


Figure 6.3. Plan of House 500 showing raised bank 553, hearth 555 and floor 554

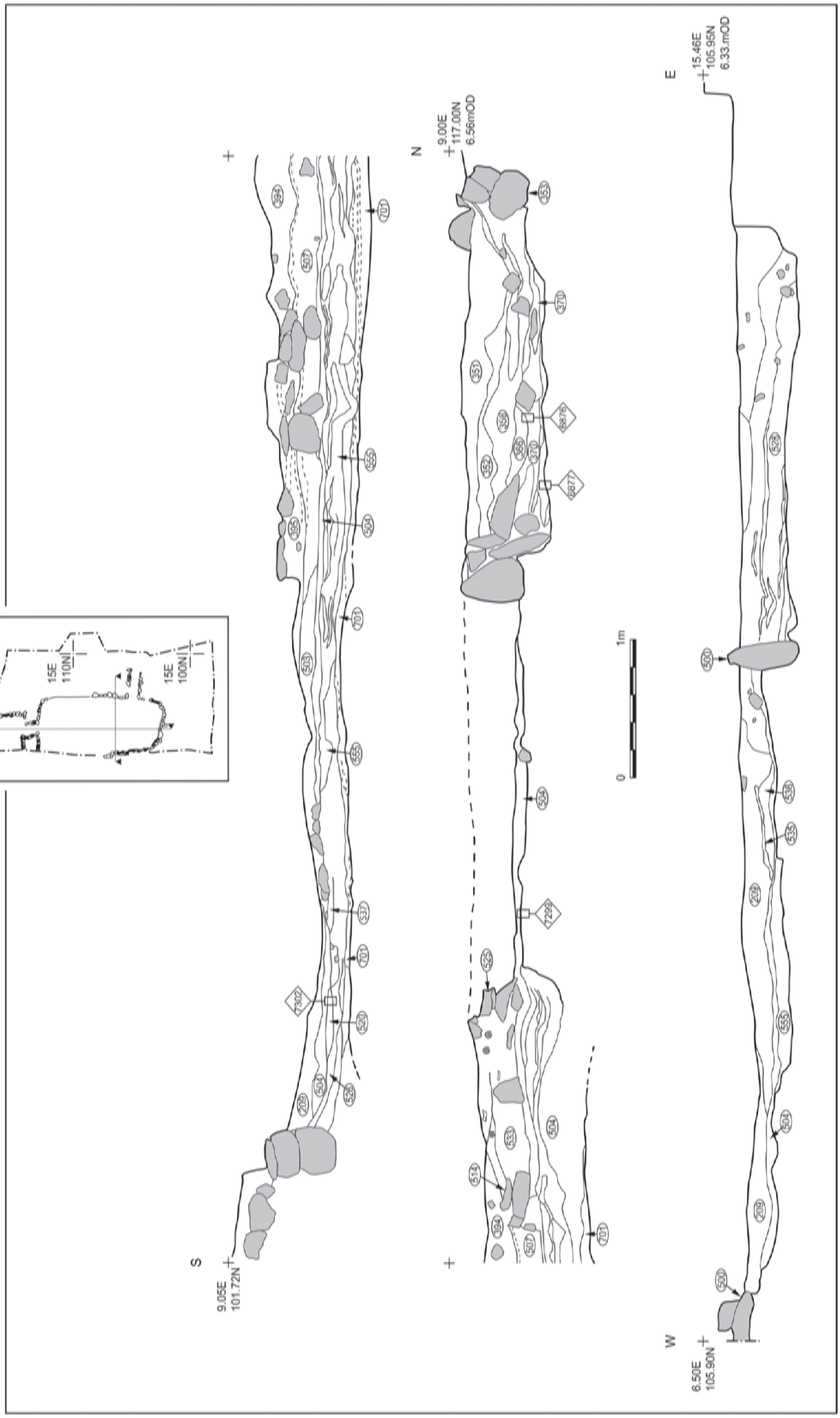


Figure 6.4. Sections through the interior of House 500

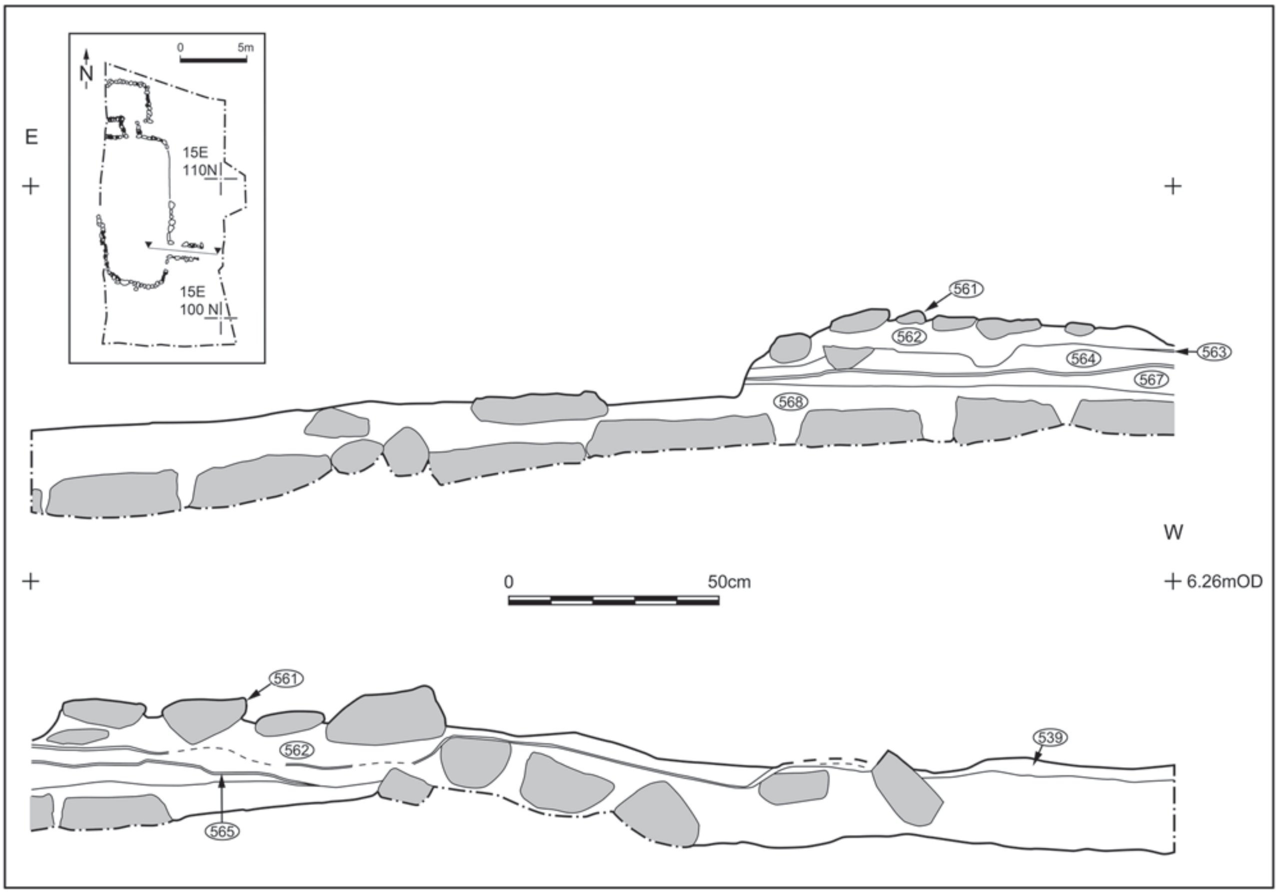


Figure 6.5. Section through the entrance passageway of House 500

Figure 6.6. The lower stone-flagged floor of the entrance passage, viewed from the east

Figure 6.7. The upper stone-flagged floor of the entrance passage, viewed from the east

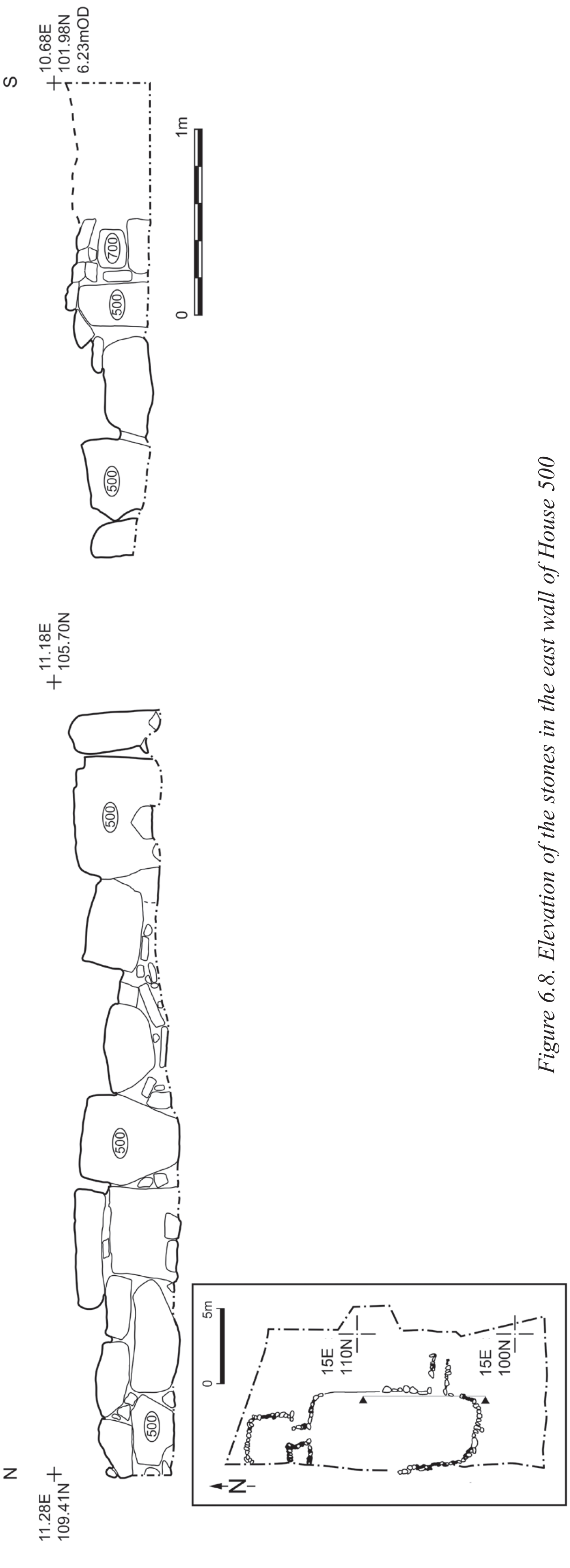


Figure 6.8. Elevation of the stones in the east wall of House 500

Given that these construction fills were otherwise largely devoid of finds, the recovery of the combs, pin and hone is unusual. We cannot rule out the possibility that these items were deliberately placed as foundation deposits behind the walls of House 500 although their incompleteness would argue against this. The construction cut (558) for the walls (353) of the north room was filled with a yellow-grey sand (557) that contained no unusual artefacts.

Construction fills within House 500

The first deposit to be laid down within the main room of the house was an extensive layer of mixed mid-brown sand (569) with lenses of peat ash and occasional stone rubble, and containing numerous bone, antler, stone and iron objects (Table 6.1), as well as pieces of slag. One comb was largely intact, as were three bone pins.

The finds of pottery and animal bones within this layer were not trampled or highly fragmented (see below) and it is not thought to have been an occupation deposit. More likely, it is a foundation or levelling layer laid down after the construction of the walls but prior to the occupation of the house. The material from within this layer is therefore likely to be either residual from the occupation of House 700, or to be freshly deposited in the period between the abandonment of House 700 and the occupation of House 500. Carbonized residue from a near-complete pot in layer 569 was radiocarbon-dated to cal AD 890–1160 at 95.4% confidence (SUERC-4887; 1025±40 BP).

There was no equivalent deposit within the adjoining north room (Structure 353). Here the only pre-floor features were a small deposit of mottled grey-brown sand (414) in the southwest corner of the structure and a small posthole (611 filled by 612). The posthole was positioned in the centre of the threshold (it may just as well belong to phase 2 as phase 4). The thin patch of mottled sand (414) contained half of an antler comb (Figure 6.9; Table 6.1), green slate and large sherds.

Whereas layer 569 was an extensive deposit, there were smaller patches of soils within the main house similar in nature to 414 that seem also to have formed make-up layers. In the entranceway leading into House 500 from the east, layer 566 was a packing layer equivalent to 569. In the southwest corner of the house, a layer of light brown sand (540) might have been another such make-up layer. In the north end, against the wall west of the entrance to the passageway that led into the north room (353), a layer of dark brown sand (576) lay beneath a small spread of redeposited peat ash (571). The only artefacts from these layers are a rove and four sherds from 576. A sequence of localized spreads within the passageway to the north room (574 under 577 under 575) seems also to have been make-up fills.

Down the central section of the western side of the house, a bank of light yellow-brown friable sand (553) was laid over the levelling layer 569, forming a raised platform along this western side of the central hearth. Layer 553 was, like 569, rich in finds: amongst the bone and iron items were a near-complete knife and a bone

Table 6.1. Phase 4 non-ceramic artefacts by context from construction contexts

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 4				
Wall construction deposits and construction fills of House 500, Structure 353 and the passageways	224	see Chap 15	iron nails, plate fragments	
	384		comb fragment (mislaid during post-excavation)	
			bone point (mislaid during post-excavation)	
		see Chap 15	iron bowl fragment, roves	
	414	1646	approximately half a single-sided composite comb	6.9, 13.3, 13.8
	474	2052	incomplete single-sided composite comb	13.3
		2716	bone point fragment	
	475	2073	flat-topped ball-headed decorated bone pin	13.11
		2078	small broken hone	16.3
	552	2187	fragment of a single-sided composite comb	13.3
		see Chap 15	complete iron nail, roves	
	553	2063	bone spindle whorl	14.1
		2071	fragment of worked bone	14.3
		2719	fragment of worked bone	14.3
		see Chap 15	iron knife, clench nails, nails, fitting, unident fragment	
	569	2064	almost complete single-sided composite comb, probably made from bone	13.3
		2096	fragment of a single-sided composite comb	13.3
		2103	comb tooth-plate	13.3
		2115	fragment of a single-sided composite comb	13.3
		2136	comb tooth-plate	13.3
		2043	worked antler tine	14.4
		2083	antler handle	14.2
		2053	club-headed bone pin	13.11
		2082	transversely flattened-head bone pin	13.11
		2102	perforated pig fibula pin fragment	13.11
		2042	bone needle fragment	14.1
		2074	bone needle fragment	14.1
		2076	decorated steatite spindle whorl	16.4
		2080	large hone	
		2062	worked cetacean rib	
		2714	bone point	
		see Chap 15	iron cylinder fragment, clench nails, roves, nails, strip, plate fragments	
	570	2045	fragment of a single-sided composite comb	13.3
	576	see Chap 15	iron rove	
	578	2134	complete bone needle	6.9, 14.1

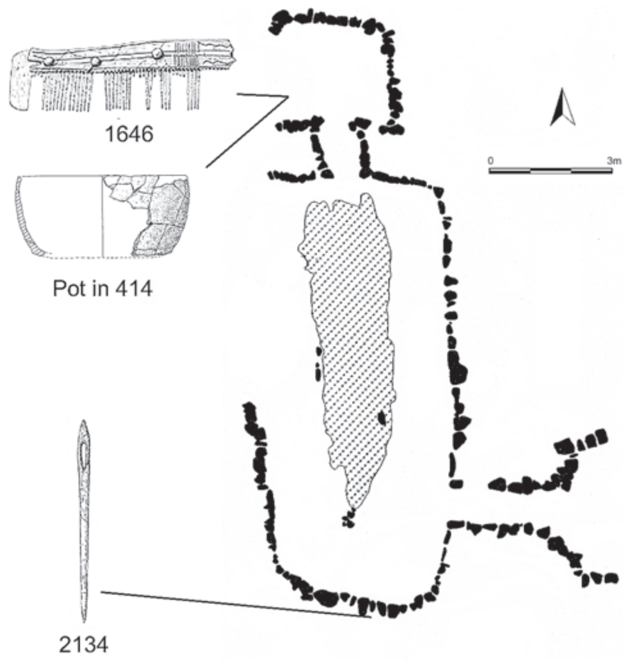


Figure 6.9. Possible foundation deposits within House 500

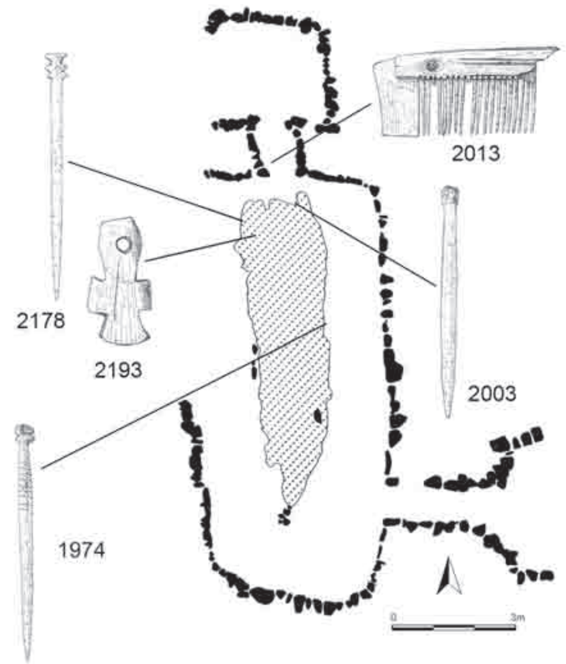


Figure 6.10. Possible abandonment deposits within House 500

spindle whorl (Table 6.1). Substantial quantities of sherds were also found in this context.

The floor of House 500

A unique aspect of House 500, unlike all other house floors within the Cille Pheadair sequence, was the extent to which its floor's contours were enhanced. The surfaces of other floors exhibited little more than a slight mounding-up in the area of the hearth, whereas the floor of House 500's main room was starkly contoured. The excellent preservation of these deposits has revealed a wealth of information on the use of space for different activities and the patterns of movement within the house.

Either side of the linear 'hump' of the long central hearth was a level and low strip running north–south. Between these strips of floor and the walls there a raised 'bench'-like strip that extended from the line of the doorway northwards through the room, especially on the west side of the house. The survival of these features provides an opportunity to gain a better understanding of the routines of household life, an extra dimension to that provided by the geochemical, geophysical, micromorphological, artefactual and environmental analyses.

Floor sequence

The earliest floors survived only as separate patches in various parts of the house. These areas of floor consisted of a black-brown layer (539) in the south of the house, an orange-brown peat ash spread in the northeast corner (556), and a mottled dark brown-black peat layer full of fish bones and other debris (554) along the east side. Floor 539 was covered by a second, localized spread of redeposited peat ash (520) and, in the southwest corner, by a wedge of fairly clean white sand (526) that may represent a re-roofing event during which windblown sand entered the building.

All of these layers were contemporary with the long, central hearth (555) and were covered by floor 504=521 =531=544=548 (the floor layers of House 500 can be seen in section in Figures 3.2, 3.14, 6.4). This floor (and hearth 555 beneath it) were, in turn, covered by a later hearth (503; phase 5). A carbonized *Hordeum vulgare* grain from hearth 555 produced a radiocarbon date of cal AD 890–1160 at 95.4% confidence (SUERC-4900; 1030±40 BP) and carbonized residue from a sherd from floor layer 548, above it, was dated to cal AD 1020–1190 at 95% probability (SUERC-4883; 940±35 BP).

Earlier floor layers

The earliest floor layer within the house was a patchy dark brown to black peaty sand (539) with shell inclusions and containing a large, perforated whale bone plate (for SF numbers, see Table 6.2). The deposit is contemporary with hearth 555 and probably with a floor deposit in the entranceway (563). It was isolated in the southern end of the longhouse, becoming thin and patchy towards its edges and only reaching up to the walls in some places. This may be all that survived of an earliest floor, the remainder being entirely worn away in the rest of the house. However, it is possible that layer 556, in the northeast corner of the house, also belongs to this earliest period of occupation. Formed of mid orange-brown, slightly organic sand, with inclusions of bone and many trampled fragments of pottery, layer 556 was probably an accumulated floor deposit associated with food preparation around the northern end of the hearth.

Adjacent to hearth 555, layer 554 was laid upon the raised, eastern extent of the construction or levelling layer 569 and was a bank of compacted, multi-lensed, black, orange and

Table 6.2. Phase 4 non-ceramic artefacts by context from house floors

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 4				
Entrance passage floor	565	2761	chalk lump, non-local	
		see Chap 15	iron comb or heckle tooth, clench nails, roves, nails, plate fragments	
Floors of House 500	upper floor 504	2008	fragment of a single-sided composite comb	13.3
		2195	fragment of a single-sided composite comb	13.3
		2199	comb tooth-plate	
		2209	fragment of side-plate of a composite comb	13.3
		2770	comb tooth	
		2253	copper-alloy binding strip	13.15
		1974	groove-headed bone pin	6.10, 13.11
		2009	bone pin fragment	13.11
		2015	transversely flattened-head decorated bone pin	13.11
		2190	perforated pig fibula pin fragment	13.11
		1889	bone needle fragment	
		2185	bone needle fragment	14.1
		1676	bone point	
		2711	bone point	
		1670	perforated whale vertebra (socket?)	14.8
		2188	bronze-stained piece of cut whale bone	14.9
		2712	whale bone peg	14.9
		1673	worked antler tine	
		2004	steatite spindle whorl	16.4
		see Chap 15	iron comb or heckle tooth, clench nail, clench fastener for furniture, roves, nails, clamp, strip	
	upper floor 531	2710	bone point	
	539	1848	perforated whale bone plate (line-winder?)	14.6
		2036	bone peg	
		see Chap 15	iron rove, unident fragment	
	upper floor 544	2012	fragment of a single-sided composite comb	13.3
		2013	fragment of a single-sided composite comb	6.10, 13.3
		2003	bone pin	6.10, 13.11
		2713	bone point	
		see Chap 15	iron wedge, clench nail, rove, nail, plate fragments, unident fragments	

brown organic sand, representing re-deposited peat ash rather than *in situ* burning (Figure 6.3). It contained two bone pins and a lead nail, one of the very few lead artefacts found at Cille Pheadair (Table 6.2; see Chapter 13.14), and had abundant inclusions of unfragmented pottery, bone and shell, especially fish bone, unlike the central hearth (555).

The size and unfragmented nature of the finds within this deposit indicate that it derived from an episode of dumping or build-up to consolidate the bank or 'bench' on the eastern side of the house. The southeastern edge of this bank displayed a very sharp, right-angled edge, possibly caused by being laid against the side of a wooden chest or

Table 6.2. continued

Floors of House 500	upper floor 548	2206	comb tooth-plate	13.3
		2189	comb tooth-plate	13.3
		2768	comb tooth	
		1965	paddle-headed decorated bone pin fragment	13.11
		1996	steatite spindle whorl	16.4
		2349	iron ring	
		2504	polishing stone	16.2
		2505	polishing stone	16.2
		2528	hammerstone	
		1995	fragment of steatite vessel	16.4
		see Chap 15	incomplete iron knife, comb or heckle tooth, needle, clench nails, nails, plate fragment, unident fragment	
	554	2198	bone pin fragment	13.11
		2021	bone pin fragment	
		2270	lead clench nail	
		see Chap 15	iron rove, nail	
	555 (hearth)	2178	transversely flattened-head bone pin	6.10, 13.11
		2193	polished bone cross pendant	6.10, 13.14, 13.17
		2709	incomplete bone spindle whorl	
		2678	bronze-stained piece of animal bone	
		2223	small iron ring	
		see Chap 15	iron clench nail, roves, nails, fitting, unident fragments	
	556	see Chap 15	iron rove, nail	

a piece of furniture that stood between the bank/'bench' and the doorway.

The hearth ran down the centre of the house's main room, and was 7.40m long with a maximum width of 2.30m (Figure 6.3). It was comprised of multiple lenses of multi-coloured orange, red, brown and black compacted organic sand (555), increasing in depth and height towards the centre and the northern end, with a maximum depth of 0.20m. There was no formal stone setting around any part of the hearth.

The hearth deposit 555 presumably represents the repetitive burning of relatively small peat fires in different areas up and down the centre of the house, rather than a single large fire more than 7m in length – a fire of such dimensions would have been intolerably hot and would have caused the house to burn down. Unexpectedly for a deposit that otherwise yielded few finds, there was a complete bone pin and a bone cross pendant (Figure 6.10; Table 6.2), both unburnt, within hearth deposit 555. These were probably placed here deliberately at the end of the hearth's use since they were neither burnt nor cracked from exposure to heat. This placement may have symbolic significance, emphasizing the centrality of Christianity in the former life of the household. Other artefacts also possibly deliberately placed are discussed in 'Complete artefacts', below.

The edges of the hearth, down the eastern and western sides, were heavily worn and compacted and displayed a shallow hollow or worn pathway running in a north–south direction down either side. As the hearth accumulated down the centre of the house, the material beneath (levelling layer 569) became eroded around the hearth's perimeter and worn into a shallow hollow, most noticeable at the northernmost end of the hearth.

Cut through the southern end of the hearth was a sub-rounded, vertical-sided pit (560) with a depth of 0.58m and with a maximum diameter of 0.54m (Figures 6.11–6.12). The pit was filled with a multi-lensed light and dark grey sand (559), with a concentration of carbonized material towards the base. The feature was backfilled not with the hearth material truncated during its initial excavation but with cleaner sand brought in from outside the house. Interestingly, its surface was capped and disguised by a thin layer of redeposited hearth material. This feature has close similarities to the pits later cut through hearth 503 (phase 5; see Chapter 7), but its concealed top suggests

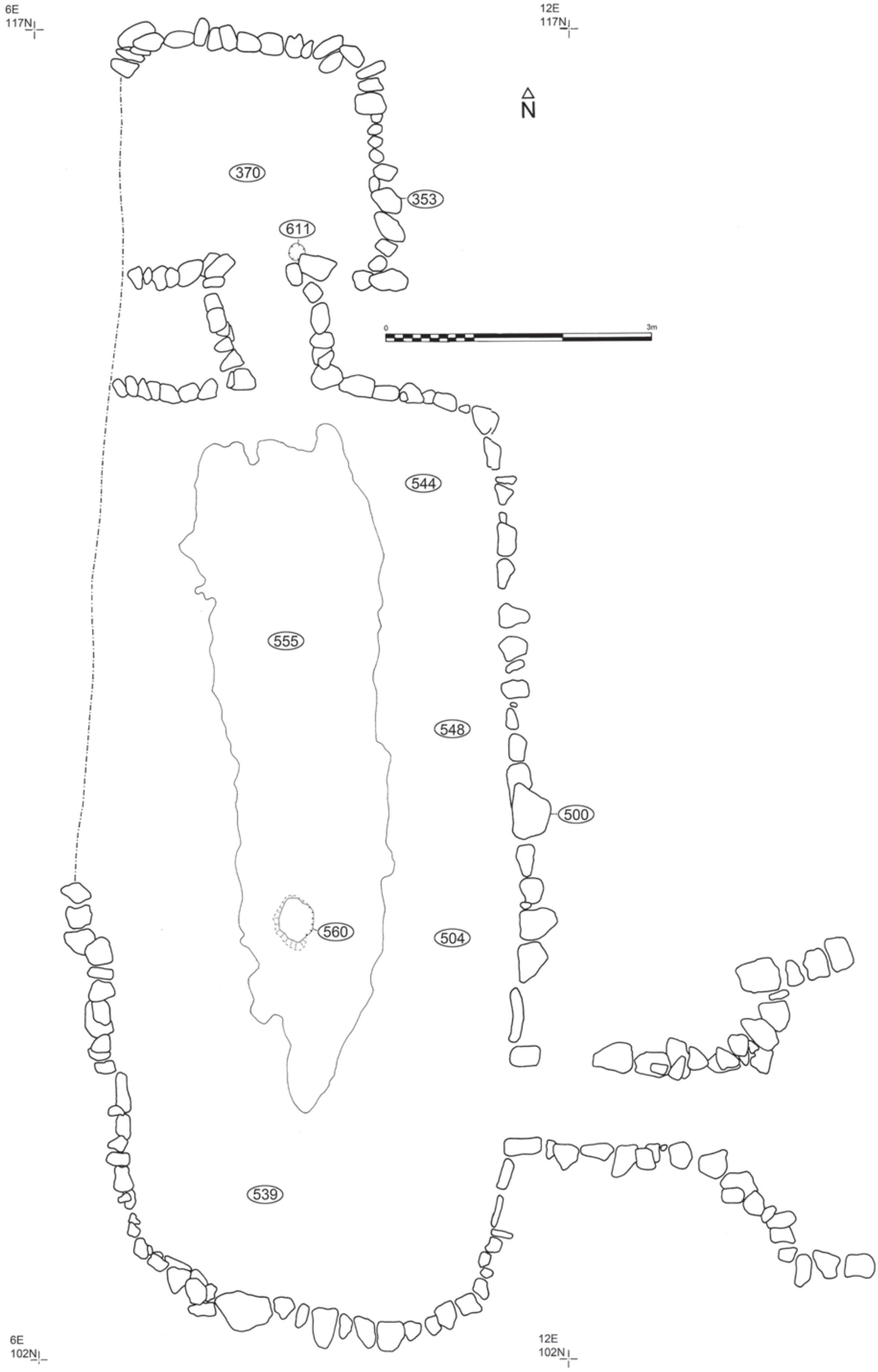


Figure 6.11. Pit 560 and later floor layers within House 500

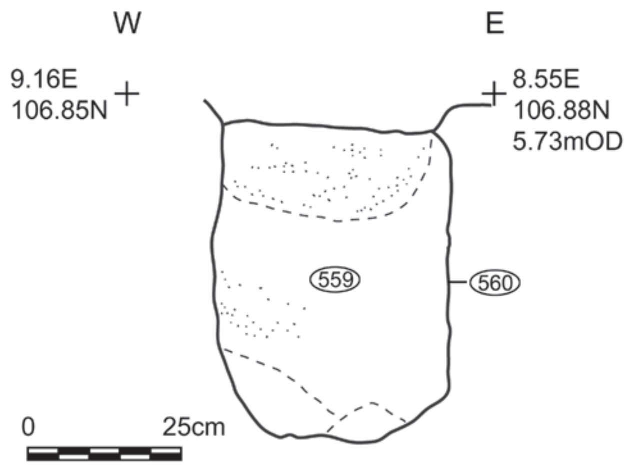


Figure 6.12. Section of pit 560 within House 500

that it could have been a hidden 'safe deposit' hole. Not surprisingly, if any valuables were once kept here, they had been removed long ago.

The only source of natural light entering the house would have been the low and narrow doorway – on occasions when the weather allowed the door to be left open. The only other sources of light would have been oil lamps and the peats smouldering upon the hearth. Ethnographic accounts of early modern blackhouses indicate that not even a vent or outlet for the smoke was provided within the thatched or turfed roof (*e.g.* Fenton 1978). Based on these historical descriptions, the presumption is that houses of the Norse period had no chimney; the atmosphere within the house would therefore have been dark and smoky.

The wear patterns within the floor suggest that, upon entering through the doorway, the majority of traffic moved to the right. This would have meant navigating around the area where a wooden chest or a piece of furniture appears to have been placed, judging by the moulded right-angle formed by the edge of layer 554 (Figure 6.3). Passage up and down the length of the house was along the edges of the hearth area, the wear of feet compacting the ashes into a firm surface along this strip.

It is presumed that the raised bank of sand to the west (553) was covered with bedding or other belongings and was not generally walked upon. This bank does not display the characteristic compaction and wear patterns caused by repetitive trampling but it does have shallow hollows more likely to be associated with continual use for sitting and sleeping, on the west side of the house. The bank of redeposited peat ash (554) to the east of the long hearth (555) has slight hollows but may well have been walked upon as people navigated around the furniture (see above).

Towards the northern end of the house these raised banks along the sides of the house levelled out and the area around the northern end of the hearth was flatter and had a greater density of pottery and animal bone fragments. This we interpret as having been the food preparation and cooking area, possibly also used for activities such as storage, spinning and weaving. Evidence for specific activities within the southern end of the house was less forthcoming during excavation.

Later floor layers

The deposits and features within House 500 were all sealed by a dark brown organic sand (504=521=531=544=548), representing the final floor accumulation within the house. This floor included dark brown to black organic sand (548) sealed beneath a later inserted wall (of phase 5; 514 and 525; see Figure 7.2), and a dark brown to black organic sand (544 north of the later wall).

The floor (504=521=531=544=548) was 0.02m–0.07m deep, extending up to the walls and over the full internal area of the longhouse (Figures 3.2, 6.11). This floor also sealed the greater part of the central hearth of the house. The first phase of a new hearth (503; phase 5) overlaid the southern end of the main hearth 555. Numerous finds from floor 504 (504=521=531=544=548) include a copper-alloy binding strip, comb fragments, bone pins, steatite spindle whorls and a large whale bone socket or stand (for SF numbers, see Table 6.2).

Within this later floor deposit at the northern end of the house, sealed beneath House 500's phase 5 walls (514 and 525), was an assemblage of decorated green-glazed pottery. These sherds of a green-glazed pitcher belong to the same vessel as sherds found within the north room (Structure 353) in layer 356 and outside the entrance of Structure 353 in layer 387 (see 'The north room', below and 'Cross-joins of the green-glazed pot' in section 6.6). This tripod pitcher was made in the Minety kilns in Wiltshire, presumably travelling via Bristol in the early twelfth century (see 'Overview', below; Figure 12.25). Its presence, stratified well below an early eleventh-century coin of Cnut (in a midden layer 394 in phase 6; see Chapter 8; Figure 8.2), indicates the difficulty of using coins for absolute dating of stratigraphy. The worn silver Cnut penny, probably struck between AD 1017 and 1023, was not deposited until about a century after it was minted.

The north room – Structure 353

This almost square room, built with drystone walling, had internal dimensions of 2.30m north–south by 2.80m east–west (Figures 6.13–6.14). Its walls survived to a height of between two and three–four courses. It was entered from the main room of House 500 through a 1.40m-long and 0.60m–0.90m-wide passageway (Figures 6.4, 6.13).

The earliest layer within the passageway was a probable floor of dark brown sand (387), covered by a layer of loose brown sand (386; phase 5). Within 387 was a stone with three black circles on it (for SF numbers, see Table 6.3), perhaps burnt on with a candle.

Hearths and floor surfaces

The earliest layers within the north room above the foundation layer 414 were a patch of grey-brown sand (409) and a central patch of red-brown sand and burnt material (410) that might have been a small hearth; this was covered by

Table 6.3. Phase 4 non-ceramic artefacts by context and context type

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 4				
STRUCTURE 353 (THE NORTH ROOM)				
Floor layers and other deposits	356	see Chap 15	iron clench nail, plate fragments, unident fragment	
	358	1447	bone point	
		1508	blue glass bead	
		see Chap 15	iron rove, nail	
	floor 366	1792	fragment of comb case	
		2718	bone point	
		2771	bone point	
		1793	bone scoop fragment	14.2
		see Chap 15	iron rove, nail	
	floor 370	1470	near-complete ceramic cup	12.8
		1788	bone pin fragment	
		see Chap 15	iron clench nail, rove, nails, unident fragment	
	387	1767	stone with three black circles on it	16.1
	562	see Chap 15	iron clench nail	
	574	see Chap 15	iron nail	
THE FORECOURT				
	144	2048	broken hone	16.3
		see Chap 15	iron nail	
	147	see Chap 15	iron nail, strip	
	565	see Chap 15	iron comb or heckle tooth, clench nails	
THE EASTERN MIDDEN				
	422	1867	nail-headed bone pin	
		1877	an unfinished bone pin	
		2694	whale bone chopping-block	14.6
		2734	bone needle fragment	
		see Chap 15	incomplete iron knife, clench nail	
	429	see Chap 15	iron clench nail, nails, strip	
	430	2192	polished bone cross pendant	13.14, 13.17
		2720	bone toggle fragment	13.14
		2196	perforated pig fibula pin fragment	13.11
		1885	bone pin-beater	14.2
		1878	whale bone clamp	14.6
		2702	worked antler beam	
		1770	cetacean bone dish fragment	14.7
		see Chap 15	two iron knives, needle, clench nail, rove, nails, clasp, strips, plate fragments, unident fragments	

Table 6.3. continued

THE EASTERN MIDDEN continued				
		1729	iron ferrule	13.16
	435	see Chap 15	iron strip, plate fragments	
	440	2191	decorated bone pin-head	13.11
		see Chap 15	iron clench nails, rove, loop, nails, strip, plate fragments, unident fragment	
	442	2437	small iron ring	
		see Chap 15	iron rove, unident fragment	
	460	2704	worked antler tine	
		2715	bone pin fragment	
		see Chap 15	iron nails	
THE NORTHEASTERN MIDDEN				
	317	1272	comb tooth-plate	
		1117	bone pin	13.11
		1288	bone point fragment	
		1298	small bone spindle whorl	14.1
		1116	cylindrical-head iron pin	13.16
		2746	bone point	
		see Chap 15	iron roves, nails, fittings, strip, unident fragments	
THE SOUTHEASTERN MIDDEN				
	126	2194	comb tooth-plate	13.3
		see Chap 15	iron cylindrical plate fragments, roves, nails, plate fragments	
	127	1940 &1941	worked antler tine	14.4
	130	1942	bone spindle whorl	14.1
	133	1958	single-sided comb end-plate	13.3
		1959	comb tooth	
		see Chap 15	iron clench nail, strip	
	135	1973	bone pin or netting needle fragment	13.11
THE NORTHWESTERN MIDDEN				
	651	2046	club-headed bone pin	13.11
Pit fill	615	see Chap 15	iron nail	

a small patch of black peaty sand (412), possibly a second hearth deposit. Above the patchy and ephemeral floor surface (409), the earliest certain occupation layer within the north room consisted of a floor layer of brown sand (370) and a central hearth of black sand with charcoal, burnt shell and burnt stones (371; visible in section in Figure 3.2). This comma-shaped spread of peat ash was probably a small circular hearth (at the west end of the 'comma'), with loose ash spread well beyond its east and northeast sides across the floor (where the soil micromorphological analysis identified ash mixed with sand but no actual hearth; see below).

Above floor layer 370 was another floor surface of brown sand (366) and, in the eastern half of the room, two hearth layers, one (368) above the other (383). This entire sequence of floors (409, 370 and 366) and small temporary hearths (410, 412, 371, 368 and 383) within the north room was broadly contemporary with the use and accumulation of floor 504 within the main part of the house. However, the deposits within the north room were visibly different in colour, composition and compaction to those in the main part of the house, indicative of the different activities and intensities of trampling within this ancillary structure. The few finds from the floors of the north room are listed in Table 6.3.

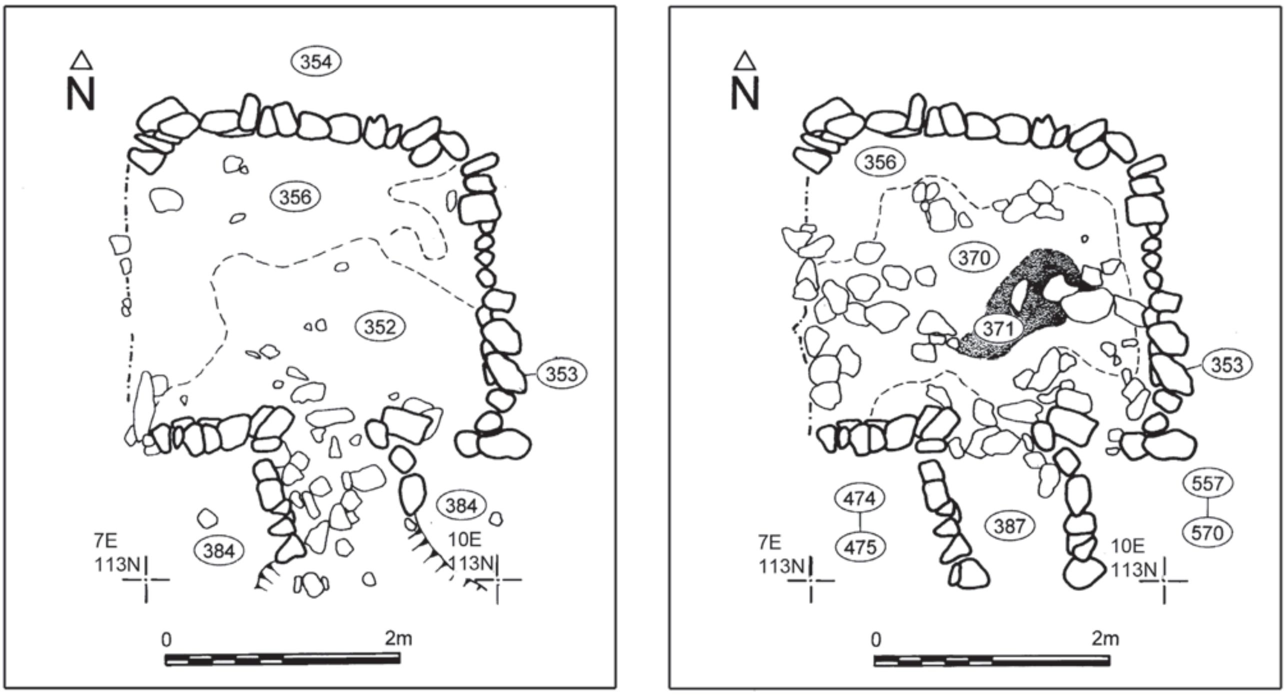


Figure 6.13. The north room (Structure 353) and its sequence of deposits; left: upper layers, right: lower layers

Figure 6.14. The north room (Structure 353), with the west half excavated, viewed from the north

It is probable that this smaller north room, deprived of natural light and with restricted access, was largely used for storage or specialized activities.

Upper fills

This sequence of floors and hearths in the north room was covered by a series of sand fills that had accumulated within its walls (Figure 6.4). The first of these to form was a blotchy, dark grey sand (358) containing large bone fragments, slag, and three artefacts, amongst them a blue glass bead (Table 6.3), the only glass found at Cille Pheadair.

Layer 358 was covered by light grey sand fills (352 [phase 5] in the south of the room and 356 [phase 4] in the north), of which 356 was laid down first. Within 356 were pieces of slag and a number of iron artefacts, together with sherds of the green-glazed pitcher mentioned above.

6.2 The entrance and forecourt

M. Parker Pearson and M. Brennand

The deposition of the lower layers within the entrance passage that led from the east side of the house into its south end could not be linked directly to the deposition of the floor layers within House 500, owing to the presence of stones forming a crude, upstanding threshold that prevented any stratigraphic link between layers inside the house and those in its entrance passage.

Some of the upper layers within the entrance passage could, however, be linked to the stratigraphy within the house, thereby tying together not only House 500 and its entrance passage but also associated phase 4 layers in the eastern midden. This link is particularly important as the midden contained the bulk of the animal bones and pottery, as well as a number of important and datable finds.

With the exception of the layers in the entrance passage, deposits between the midden to the east and the houses from which the midden refuse was created were truncated by the construction of subsequent houses. Thus, the only stratigraphic connection between the house and the midden is via the forecourt and entrance passage of House 500. Consequently, the phasing for some of the layers within the midden (described below) has been inferred from stratigraphic observation of the accumulation of deposits within this entrance (see Figure 5.11).

The entrance passage deposits

The entrance passage had a stone-flagged floor (Figure 6.6). Within and on top of this, a dark brown organic sand (568) accumulated during the occupation of House 700 (see Chapter 5.1 and Figure 5.11). Above this first passageway floor was a layer of white sand (567), probably representing a windblown accumulation (Figure 6.5). This was overlain by a friable grey-brown sand (566) that might have been a levelling layer akin to 569, the extensive foundation or levelling layer within the main room of the house.

Layer 566 was subsequently overlain by a red-brown sand (565) that formed the first floor of House 500's entranceway and forecourt. Within the entrance passage this deposit was overlain by a patchy deposit of grey-brown sand (564). Within the forecourt it was overlain by a thin deposit of friable yellow-brown sand (147). Layer 564, within the entrance passage, was itself covered by a dark red-brown sand (563), a floor which was the stratigraphic equivalent of floor layer 539 within the main room of the house (see 'The floor of House 500' above).

Entrance passage floor 563 was subsequently covered by a light grey-brown sand (562), onto which was placed an upper layer of stone paving (561). This level surface of flat, unworked beach cobbles ran down the narrow entrance passageway for a length of 2.60m, but did not extend into the forecourt (Figures 6.5–6.7). The paving stones were later covered in phase 5 by an extensive layer of off-white, windblown sand (129) that extended into the forecourt (see Chapter 7).

The forecourt

Within the forecourt the layer of yellow-brown sand (147, above 565) was overlain by a light grey sand (144=149) which was the stratigraphic equivalent of a light grey midden layer (442) in the eastern midden (see below; Figure 5.11). Within 144 was a small hone. This layer was subsequently overlain by a layer of friable brown sand (140) that covered the surface of the forecourt. This was in turn overlain by a thin layer of compacted black organic sand (141) and a friable light brown sand (142), both covered by a thin lens of grey sand (145).

These layers were sealed by a layer of light grey windblown sand (128 in phase 5; shown in Figure 5.11) with inclusions of dog coprolites. The layer of windblown sand (128) and the presence of the dog coprolites indicate that the entrance and forecourt had been abandoned by this point and were no longer swept out, and that House 500's remodelled Stage II entrance (phase 5), a few metres further north, was now in use (see Chapter 7). Thus the layers (140, 141, 142 and 145) beneath 128 were the last to form in the forecourt during phase 4.

Dog coprolites

Forecourt layer 144, a grey sand deposit (=149=442), laid down early in phase 4, contained a single coprolite fragment whereas there were at least four separate stools from the later windblown sand (128) of phase 5 that filled the forecourt and signalled the end of its cleaning-out and the end of the doorway, entrance passage and forecourt's use.

6.3 The associated middens

M. Parker Pearson and M. Brennand

The eastern midden

The latest midden layer of phase 4 was 422. The earliest within phase 4 that could be linked with certainty to House 500 was 442 (Figure 5.11). The final midden layer of phase 3 (layer 443 containing stones thought to have collapsed from the wall; see 'The midden sequence' in Chapter 3) was overlain by a loose white sand (442) that is the stratigraphic equivalent of the grey sands (149=144) within the forecourt of House 500. These were overlain by a friable grey sand (460) and a compact, dark red-brown sand (440) with shell and stone inclusions; finds are listed in Table 6.3.

Also under 440 was a black peat ash midden deposit (461) belonging to phase 4. Layer 461 covered 425 (a final deposit of phase 3; see 'The midden sequence' in Chapter 3) and was probably equivalent to 460 and/or 442. Layer 440 was subsequently overlain by a loose light brown sand (435) with stone inclusions; layer 435 lay beneath a dark grey to black peaty loam (430). Layer 430 contained a small number of unusual artefacts (Table 6.3), including a polished bone cross pendant, similar to the one found in the hearth of House 500 (in layer 555; see above).

On top of 430 was a light grey sand (429), covered by a compact, red-brown peaty sand (422) with shell and stone inclusions and containing bone pins. This deposit (422) is the stratigraphic equivalent of the lighter coloured sand (140) within the forecourt of House 500 (Figure 5.11).

The northeastern midden

The only layer to accumulate in the northeast corner of the site, outside the sandbank, in this phase was 317, on top of 425 (phase 3) and below 318 (phase 5). It was a thick layer of loose grey sand that contained large quantities of bone fragments, eggshell, sherds and a number of artefacts, including an iron pin and a bone spindle whorl so small that it was probably a toy (Table 6.3).

The southeastern midden

To the south of the entrance passage and forecourt of House 500 a series of midden layers continued to accumulate in phase 4 (see Figure 5.11). Layer 137 (the final layer belonging to phase 3; see Chapter 5.3) was overlain by a spread of light grey sand (136) subsequently sealed by a compacted layer of slightly organic red-brown sand (135) with inclusions of animal bones, charcoal and burnt stone; a bone pin fragment also came from this layer (Table 6.3). Layer 135 was itself sealed by an extensive spread of silver-grey sand (133); although this deposit was relatively sterile, it did contain comb fragments. This sand layer (133) was overlain by an isolated patch of compacted, red-brown organic sand (132). These deposits were subsequently covered by friable, light grey sand (130), containing a bone spindle whorl.

Above grey sand layer 130 was a deposit of compacted, slightly organic brown sand, possibly deriving from turf (126, which produced an antler comb fragment) and an isolated dump of compacted, dark brown to black organic sand (131). The deposit of possible turf (126) was overlain by a compacted, red-brown organic sand (127) with shell inclusions and containing a piece of worked antler. These deposits were finally covered in phase 5 by an extensive but thin layer of windblown sand (122; phase 5) that also extended across the forecourt.

The layers within the depression to the south of the entrance passage (see 'The southeastern midden' in Chapter 5.3) seem to have been successive dumps of hearth ash from within the house. Each ash deposit was covered by a thin layer of windblown sand. In comparison to the artefact-rich layers of the eastern midden, these layers of ash were relatively sterile: they did not contain the same densities of shells, pottery or animal bones. This paucity of inclusions is comparable to that seen in the hearth deposits at the centre of the house, which were also relatively sterile, containing only a few artefacts or finds of pottery or animal bone.

The southeastern and eastern middens, on either side of the doorway to House 500, thus appear to have been divided into two separate zones of deposition, the area north of the entrance (eastern midden) being for waste from butchery, filleting, food preparation and the sweepings from the floor, and the area south of the entrance (southeastern midden) for hearth ashes which were simply thrown to the immediate south of the house's entrance.

The northwestern midden

As mentioned in Chapter 5, midden deposits were identified both inside and outside the east–west sandbank wall on its northern circuit. Parts of the deposits outside the wall were excavated and others were investigated within the embanked enclosure's interior. Since the stratigraphic relationship of these midden deposits to the buildings within the enclosure was interrupted by the sandbank enclosure wall (150=321=482), it is only possible to link this sequence of layers to the site's phases by comparison with the heights of the phased midden deposits east of the enclosure wall. On this basis, these northwestern midden layers belong to phase 4 and later. Deposits in this northwestern midden area were poor in finds, which consisted primarily of animal bones, with no pottery

The exterior: outside the sandbank wall

The area outside the northern stretch of the sandbank wall filled up with midden deposits sandwiched between layers of sterile grey and brown sands and clean windblown sands. This area of the midden was provisionally numbered *in toto* as 651 when excavated in 1998. Subsequent excavation of this area in 2003 revealed a sequence of deposits, described below, but, for post-excavation analysis, all finds from this stratigraphic sequence were grouped as 651. Layers 774 to 782 were excavated and their finds analysed as context group 651; only parts of 774, 775 and 781 were excavated.

The uppermost of the deposits (layers 782 over 781=783) sat upon the top of the sandbank wall (Figure 6.15). These deposits continued north of the bank, where they covered a series of light brown and grey sand layers (780) that survived to a maximum depth of 1.00m. The deposits had occasional inclusions of shell and bone but were neither as organic nor as rich in finds as the midden deposits excavated in all the areas of the site to the south, and may represent non-household waste being mixed with windblown sand. The layers became thinner and cleaner towards the north, terminating at 136.7m N.

A club-headed bone pin was picked out of the section near the top of the sequence of deposits numbered as (651), 4.60m north of the sandbank wall. However, no pottery was recovered from any layers north of the sandbank wall. Animal bones were sparse although a good proportion were large and even complete.

The retaining wall on the enclosure's exterior

By 2003, severe Atlantic storms had caused significant erosion of the sand cliff on the western, seaward side of the site, driving back the north–south beach-facing section by some 3m from its position in 1998. This erosion revealed a two-phase midden-retaining wall running northeast–southwest for at least 8m (Figures 6.15–6.16).

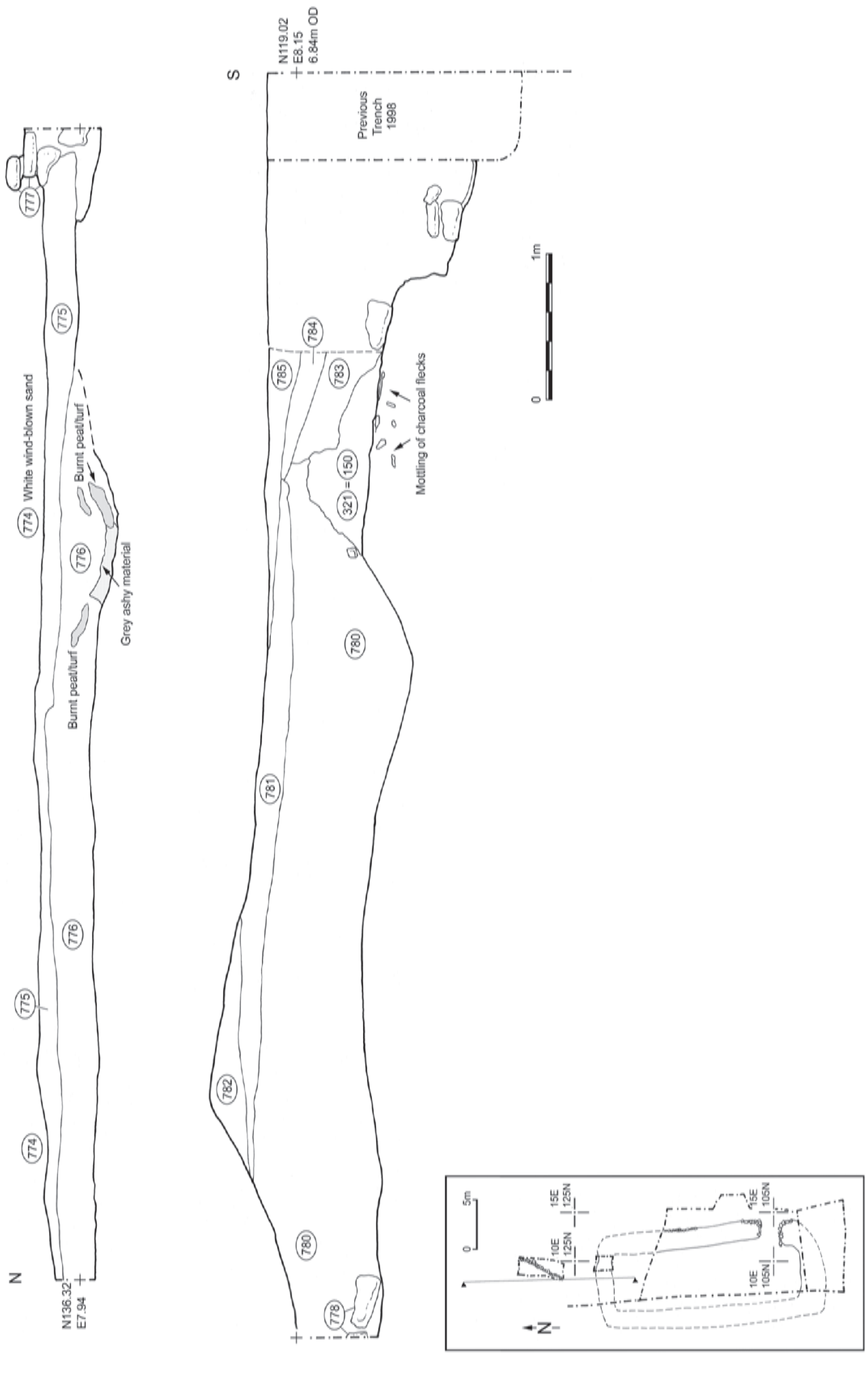


Figure 6.15. Section through the northeast revetment wall (777) and the north wall of the sandbank enclosure

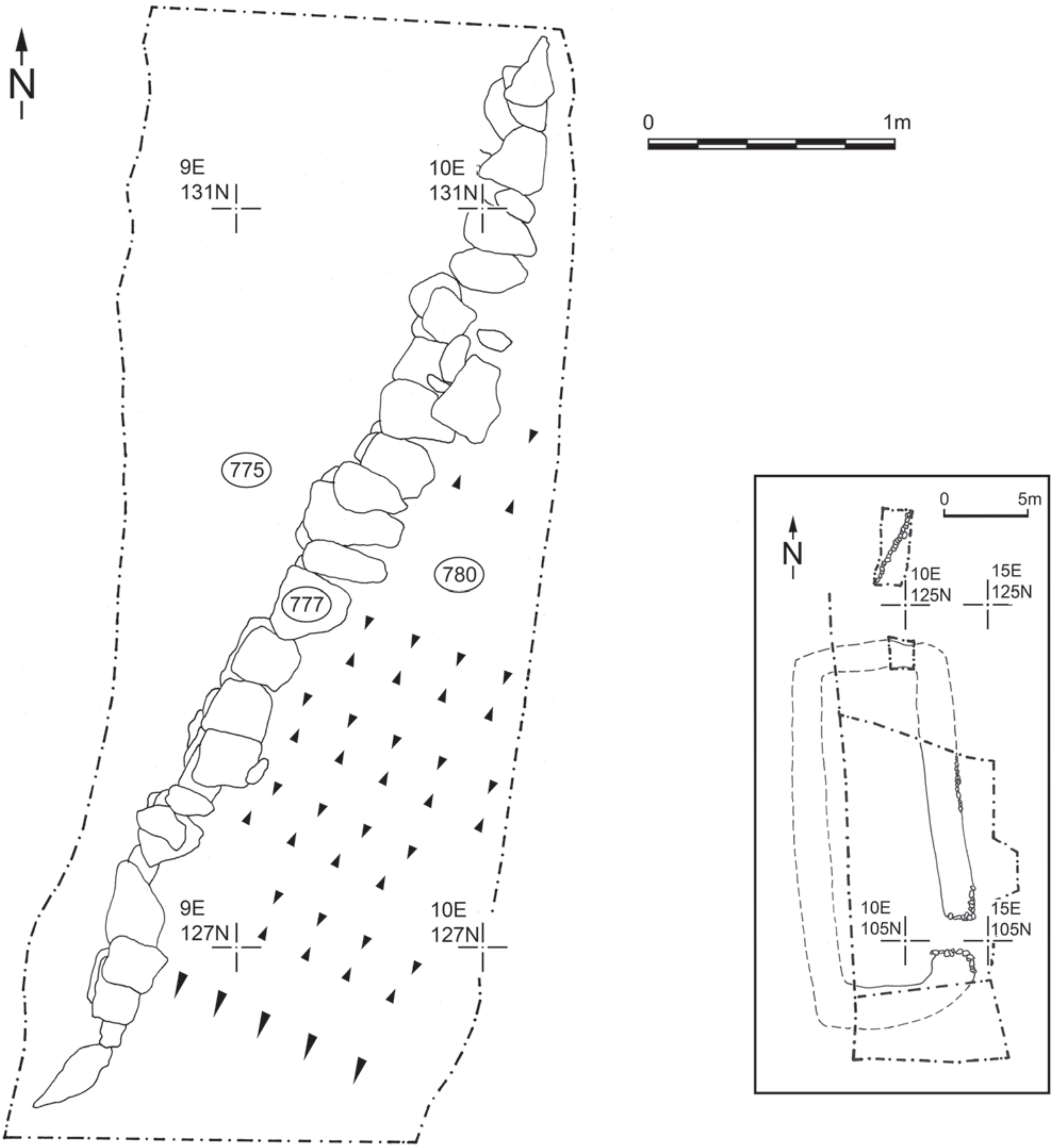


Figure 6.16. Plan of the northeast revetment wall (777) and associated deposits

This wall had probably once met the northwest corner of the sandbank enclosure, forming a windbreak to protect the midden layers east of it.

The wall's first phase (778) was associated with the lower layers of 780 (a light brown sand with shells and bone but no pottery) to its east and layer 776 (clean sand with occasional burnt peats) to its west. The second-phase wall (777) had a red-brown sand layer (775) on its west side and the upper part of 780 on its east side.

Wall 777 and the top of layer 780 were dissected by ploughmarks running ENE–WSW. This ploughing event probably occurred at the end of the occupation sequence (phase 9 or later; see Chapter 11) when the edge of the settlement mound was being eroded by the wind, removing higher layers (781 and 782) from the edge of the mound.

The interior: inside the sandbank wall

Cut into the fill layer 354 (phase 2; see Chapter 4.2) were two oval or circular round-bottomed pits whose southern edges were exposed in the northern limit of the excavation. Pit 614 was 0.43m in diameter and pit 616, to its east, was 0.48m across. The fill (613) of pit 614 contained bone fragments in a brown sand and the fill (615) of the other pit was mottled brown and cream sand containing

bone fragments, an iron nail head, and a number of quartz pebbles at its base. The northern edge of a third pit (788) was located on the southern side of the sandbank but its fill (787) was not excavated.

The top of pit 788 was covered by a dark grey sand (783) that lapped against the inside face of the northern sandbank wall. This was the same as 781 to the north of the sandbank. On top of it lay a dumped yellow sand (784), covered in turn by a dark grey/black mottled sand (785) that sealed the layers lapping over the top of the sandbank wall (Figure 6.15). This uppermost midden layer was covered with a clean windblown sand, which accumulated after the settlement was entirely abandoned. Before that moment (presumably in phase 9 or later) it was ploughed east–west on a slightly different alignment to the ploughing further north (see above).

Dog coprolites in the middens

A small but significant number of canine stools accumulated within the eastern and southeastern middens during phase 4. In the southeastern midden, layers 135, 133 and 132 all contained fragments as did layers 440, 435, 430 and 429 in the eastern midden, and 317 in the northeastern midden. There were no coprolites from the northwestern midden.

6.4 The spatial patterning of debris within the house floor

M. Parker Pearson, H. Smith, H. Manley and P. Marshall

Methods of analysis for magnetic susceptibility, geochemistry and flotation, along with sampling strategies using a 0.50m by 0.50m grid, are discussed in Chapter 5. The analysis of House 500's phase 4 floors involved certain problems of definition and sequence but the variety and densities of material have provided clear patterns that give much better definition than those of phase 3. The distribution patterns of the various categories of debris shed light not only on the activities and routines within House 500 but also help our understanding of the murkier patterning within House 700.

There was no contamination between floor 701 of the preceding house (House 700) and the floors of House 500 above it. Although spatial patterns of material were broadly similar in both houses, the elongated dimensions of House 500 meant that these patterns were not directly on top of each other (for example, the northeastern corner of House 500 and of its floor did not lie directly above the northeastern corner of House 700).

Since contamination between the floors was avoided by careful excavation, the only serious problem for the analysis of the floors of House 500 was the extent to which a coherent floor sequence could be teased out of the complex and compressed stratigraphy. The lower layers were all very patchy and one of them, 554, was formed with debris that had clearly been incorporated into the ashy matrix before the deposit was laid down in the house. Thus much of the micro-debris within 554 is unlikely to have derived from activities carried out in this part of the house after the layer was deposited.

There was an initial period of occupation during which the house was kept very clean, with only floor layers 539 and 556 surviving *in situ* from this phase. Thereafter, the lens of windblown sand (526) in the south end may be evidence of a period of roof repair, during which sand entered the house.

For floors 366 and 370 in the north room (Structure 353), their eastern third was excavated in block and not in 0.50m × 0.50m sample squares up to the north–south section line. When it was realized that these ephemeral layers 366 and 370 (visible in section in Figure 3.2) were in fact floors, the remaining western portion of these floors was sampled in grids. Consequently there are no grid squares for the eastern portions of these floors, although the artefacts from this area of these floors can be quantified and analysed as an amalgamation.

Magnetic susceptibility

Two areas within the house floor produced levels of magnetic susceptibility (χ) greater than the background levels of 200 ($10^{-8}m^3kg^{-1}$) or less (Figure 6.17). One of these was the long hearth (555), with elevated levels of over 500 ($10^{-8}m^3kg^{-1}$) within the north end and the middle of the hearth. The other was the northern third of floor (554) along the east wall of the house, where its elevated values could indicate that this material (554) was re-deposited peat ash laid down to form a floor surface.

Total phosphorus

Overall, values of total phosphorus were higher and more widely dispersed across House 500's floor (Figure 6.17) than in floor 701 during the previous phase (phase 3). This is probably because of the greater longevity and intensity of use of House 500 in phase 4. The highest concentrations of above 5,000 ppm (or mg/kg) were found at three locations: within the north end of the long hearth (coinciding with elevated magnetic susceptibility), within the small hearth in the centre of the north room, and in the southwest corner of the longhouse. The latter coincides with a slight enhancement of magnetic susceptibility (but the hearth in the north room does not). It is likely that the two hearth areas with elevated total phosphorus were associated with accumulated food and fuel waste produced in cooking activities.

There is little correlation of elevated total phosphorus in the southwest of the house (and in the south end more generally) with any other residue concentrations except for burnt fishbone and fuel ash slag (Figures 6.17, 6.18; see below). However, the soil micromorphological evidence from this part of the building (sample 7302; see below) is consistent with its use as an animal byre.

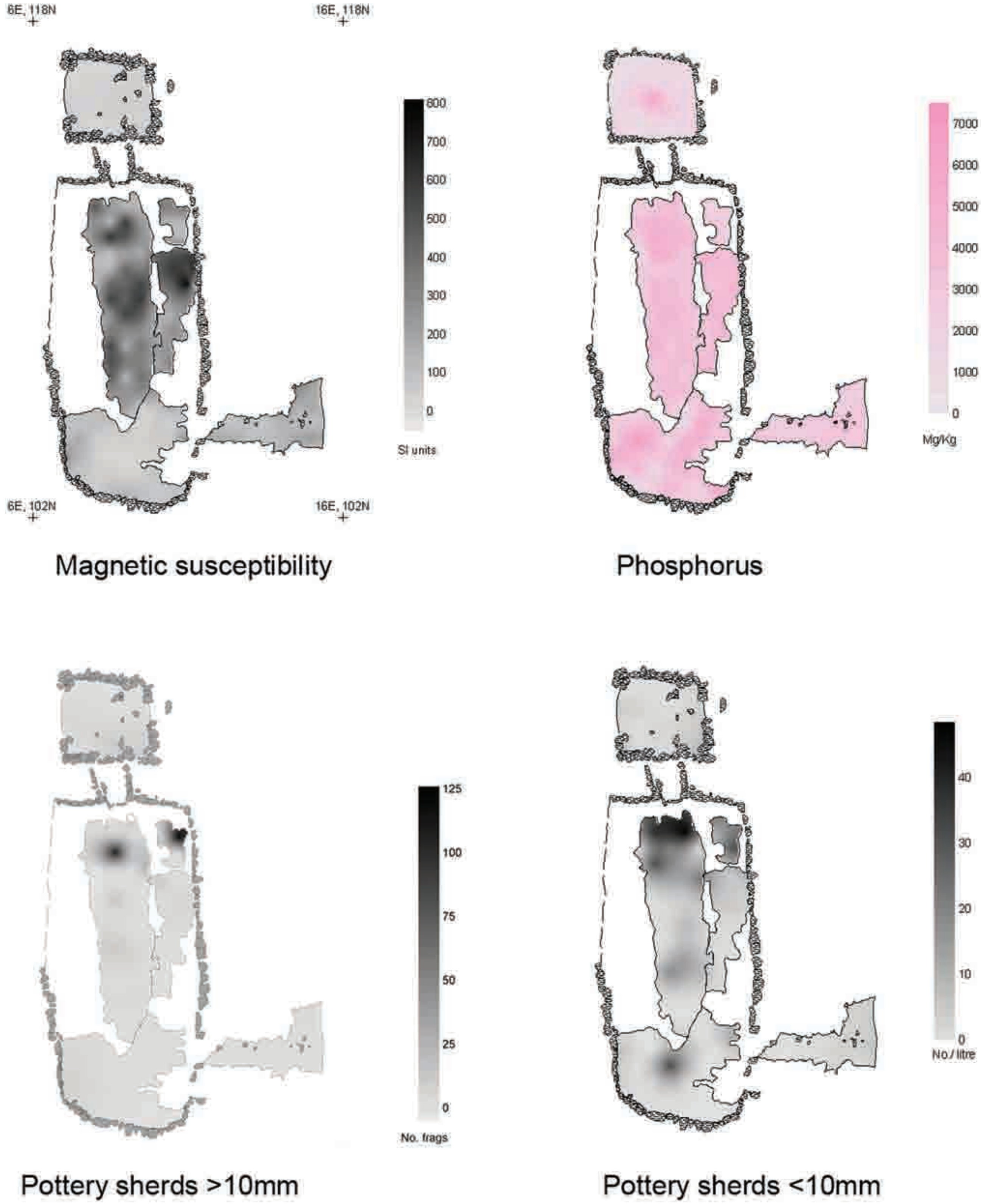


Figure 6.17. The distribution of levels of magnetic susceptibility and total phosphorus, and of pottery, mammal bones, fish bones, crab and eggshell in the lower floor (370, 539, 554, 555, 556, 565) of House 500 (continued over the next two pages)

Ceramics

In contrast to the meagre quantities of pottery in floor 701 of the preceding house, there were hundreds of sherds in House 500's floors (Figure 6.17). Within the earlier floor (collectively floors 370, 539, 554, 555, 556 and 565), larger sherds (>10mm) were concentrated in the central north end of the hearth and in the northeast corner (Figure 6.17), whilst smaller sherds (<10mm) were distributed

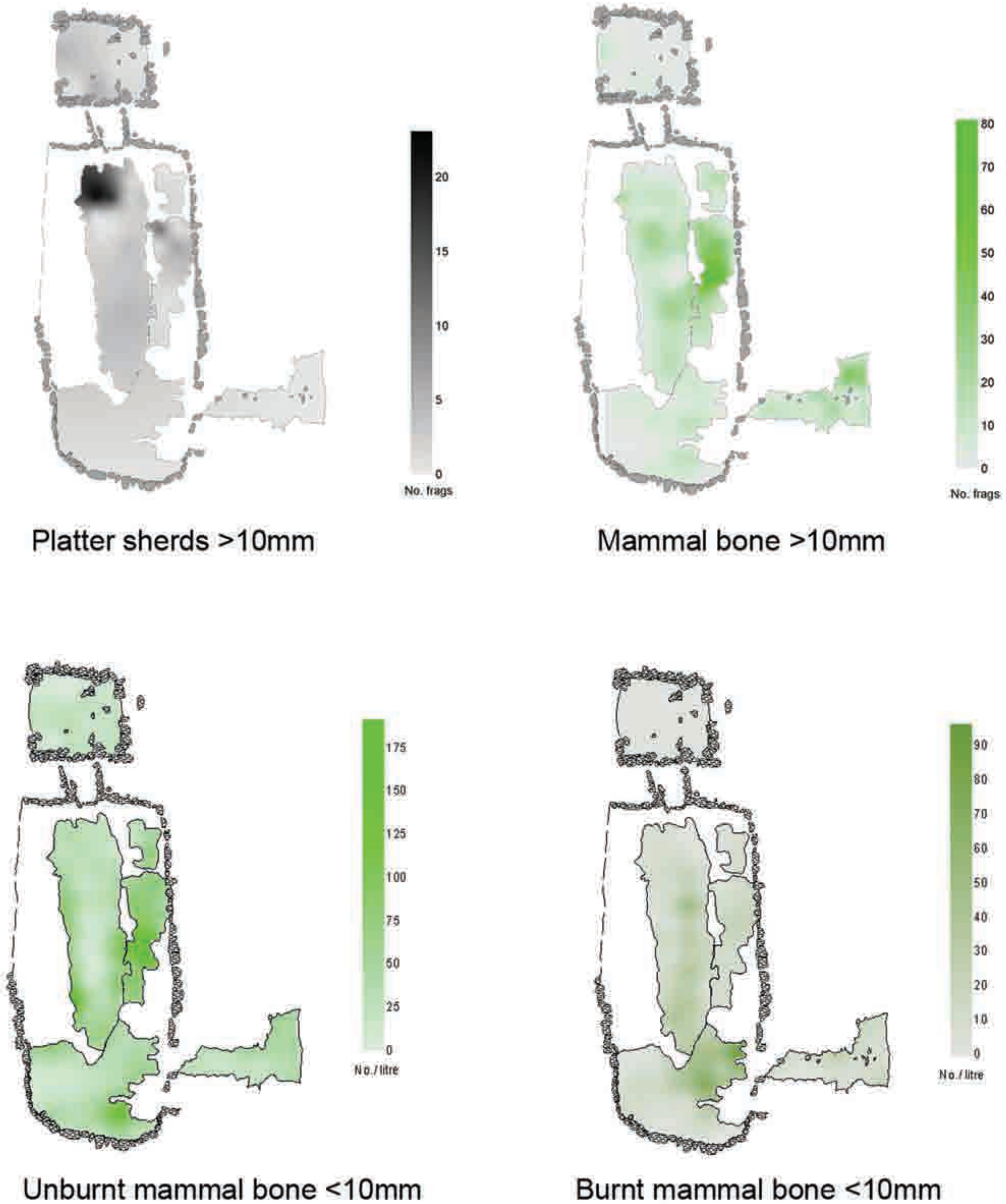


Figure 6.17. (continued from the previous page and on the subsequent page)

in these same locations along with a small concentration beyond the south end of the hearth (Figure 6.17). This latter concentration could possibly be the result of sweeping southwards towards the doorway. In the entrance passage and forecourt (floor 565) densities of sherds were very low, indicating that sherd refuse did not pile up immediately outside the house.

Within the later floor (504 and 366) the distribution

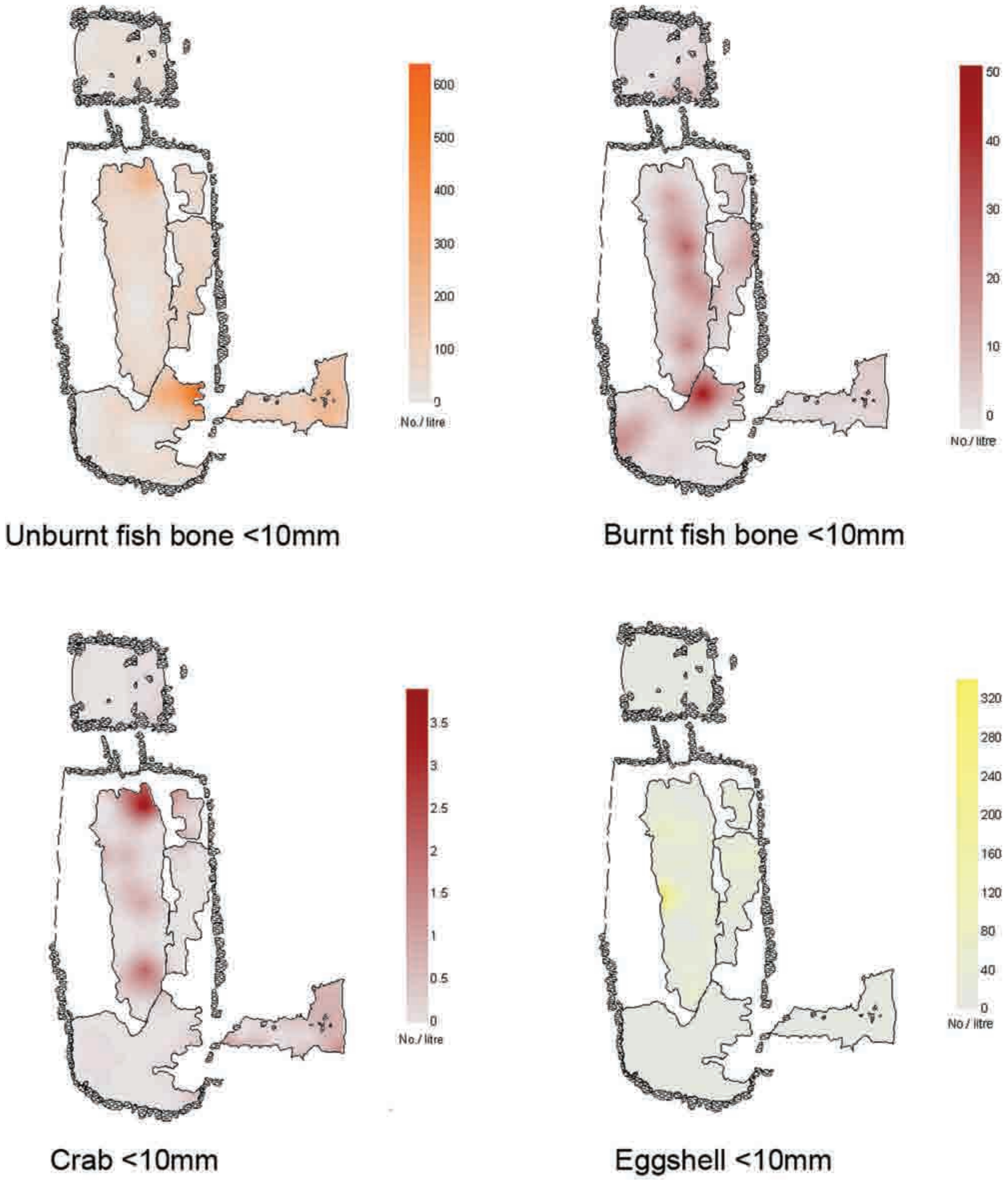


Figure 6.17. (continued from the previous two pages)

of large sherds <10mm in size (Figure 6.22) was mostly concentrated in the northeast corner of the main room, between the two concentrations of the earlier floor. Smaller sherds (<10mm) in this later floor were concentrated in this area on the northeast side of the hearth but there was also another concentration in the southeast corner of the house (Figure 6.22).

In the north room (Structure 353), sherd densities were low in both floor layers (366 and 370) although there were many more sherds in 370. Within floor layer 370, appreciable numbers of sherds appear to have been clustered beside the opening to the passageway, perhaps collected here from sweeping. Together with many of the bone fragments, the remainder of the sherds in 370 were distributed along the wall edges, again suggesting a distribution resulting from sweeping.

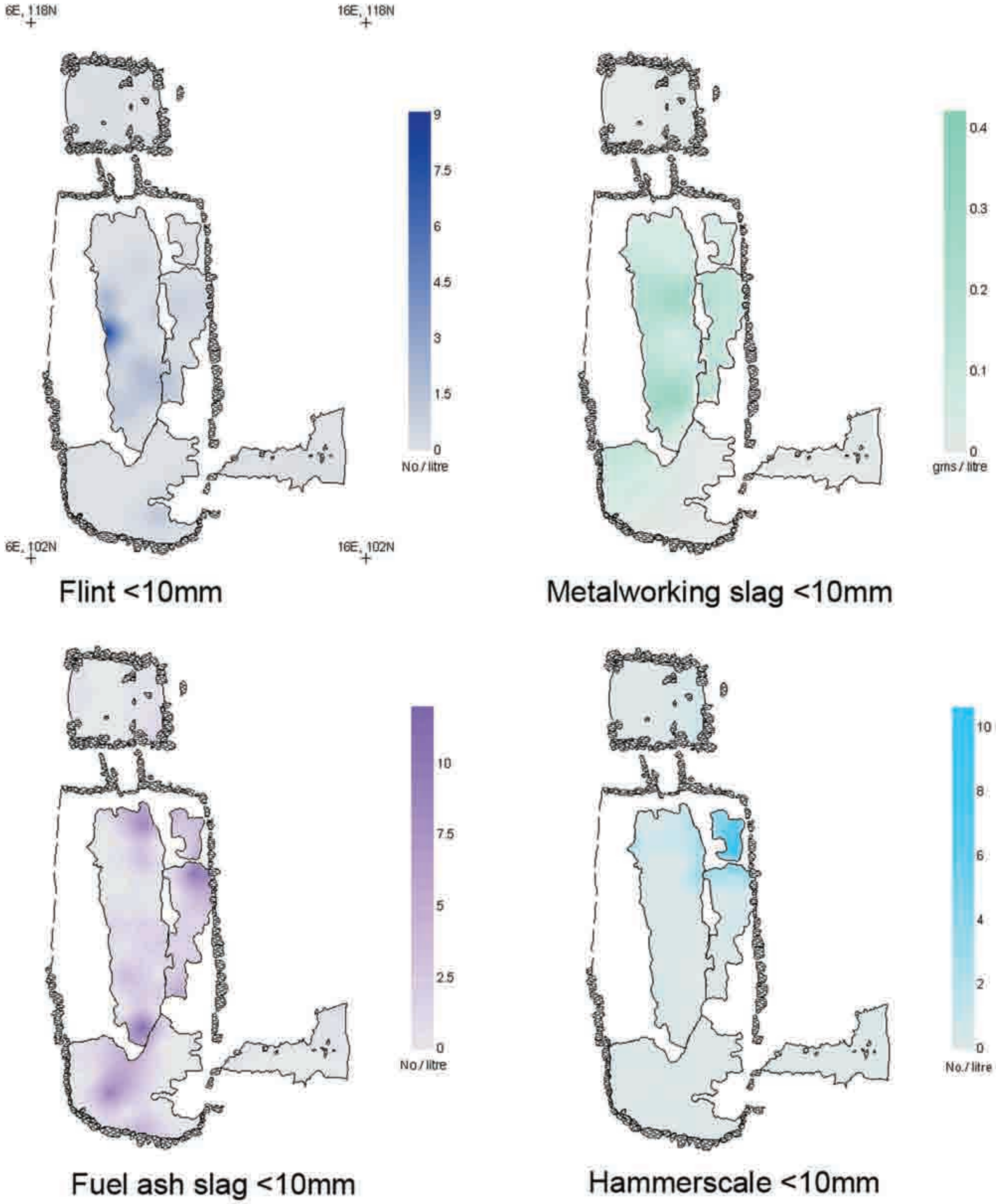


Figure 6.18. The distribution of flint, ironworking and fuel ash slag, hammerscale, Spirorbis, seaweed and coprolites in the lower floor of House 500

The larger quantities of small sherds (<10mm) in the lower floor (collectively floors 370, 539, 554, 555, 556 and 565), in contrast to the upper floor, suggest that the lower floor was a longer-lived surface, with much trampling to break the sherds down into small fragments. This pattern of larger quantities of small material (<10mm) is repeated for other classes of materials across the earlier floor. This suggests that the lower floor remained in use for a long period and that the upper floor (504 and 366), with its fewer small fragments and higher proportion of larger fragments, was used for a much shorter period leading up to the house's abandonment.

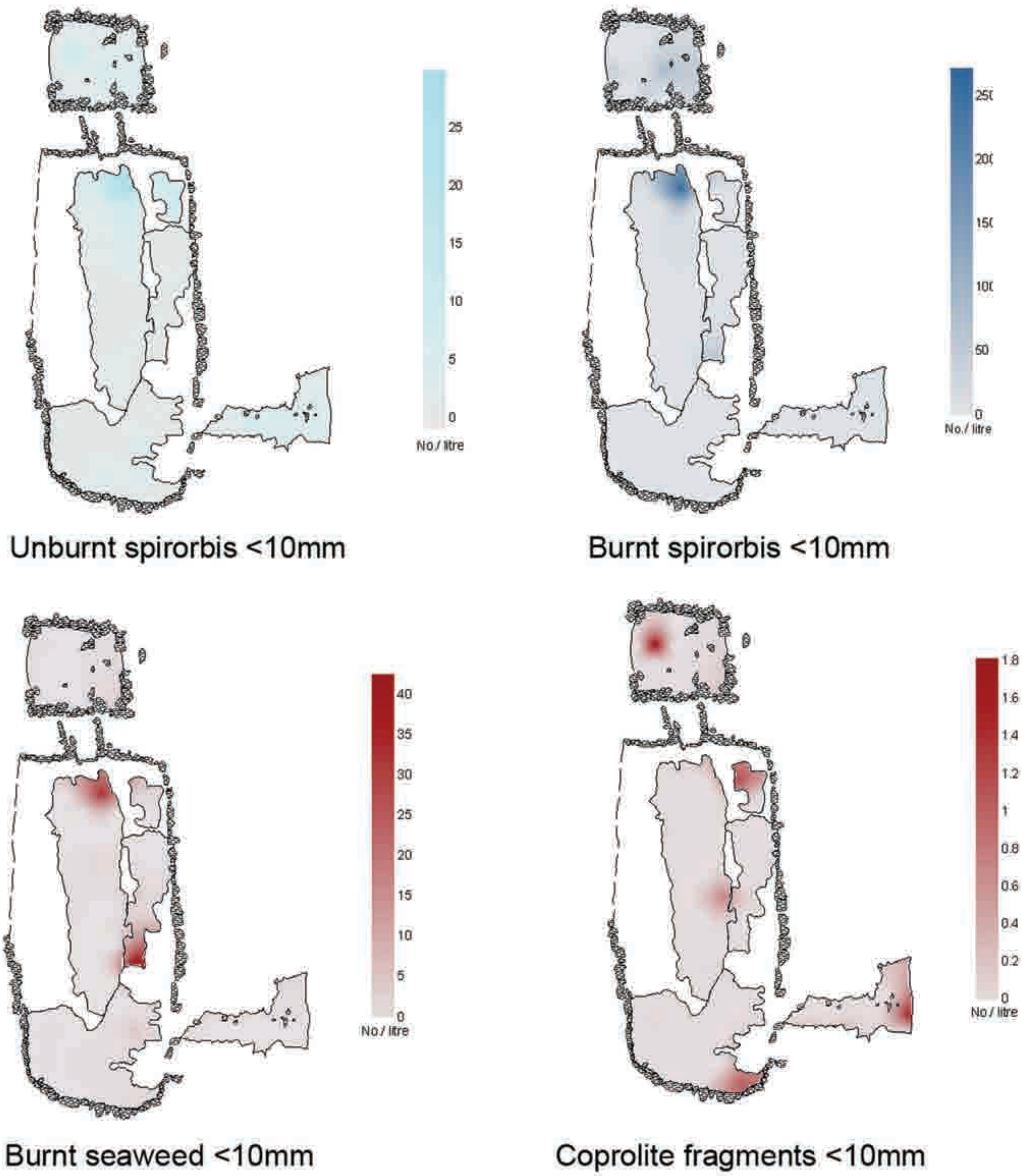


Figure 6.18. (continued from the previous page)

Platter ware

In floor 701 (phase 3; House 700) there was no platter ware amongst the sherds within the house floor. The pattern is very different in House 500, with a good-sized assemblage of this distinctive ceramic baking ware. Broadly, its distribution matches that of the other ceramics but there are areas of the lower and upper floors where platter sherds form a considerable proportion of the sherd debris at the north end of the main house (Figures 6.17, 6.22). For the lower floor (collectively floors 370, 539, 554, 555, 556 and 565), most platter sherds were found slightly west of the concentration of larger sherds in the centre of the north end of the hearth (Figure 6.17). Similarly, platter sherds in the upper floor were concentrated at the northeast corner of the hearth and just beyond it.

This suggests that platters were used and broken closer to the edge of the hearth than the cooking pots. This contrasting distribution raises the possibility that the

baking of barley cakes (if this was the use of these flat ceramic 'plates') might have been arranged differently to the boiling of foodstuffs.

Within the north room platter ware accounts for nearly all the sherds on the west side of floor 370, although it is rare amongst the sherds on the east side.

Clay

Considerably more unbaked clay was recovered from the floors of House 500 (Figure 6.19) than from House 700. All but six pieces came from the lower floor (collectively floors 370, 539, 554, 555, 556 and 565) and were distributed primarily in three areas: the south end of the main room, the south half of the long hearth, and the north end of the long hearth. Most lumps are brown clay without grits whilst the remainder are of grey-green or grey clay tempered with grits, generally gneiss (shaded in Figure 6.19).

Within Structure 353, the clay lump from 370 and the two from 366 are all of grey-green clay. Clay was found only in the western half of this north room.

Given the absence of temper within most of the clay lumps, it seems that most of the clay fragments from the main house's hearth and its north side are probably related to pyrotechnological activities unrelated to potting, as are most of those from the south end of the main room. The distribution of the latter is probably not the result of sweeping debris towards the doorway, given their distance from the entrance, and may relate to activities performed at this end of the building. Since four lumps of potential potting clay (containing grits) were found at the south end, these activities might have included potting or clay storage.

Animal bone fragments

Almost every sample square within the main house contained one or more mammal bone fragments (Figures 6.17, 6.22).

In the earlier floor (370, 539, 554, 555, 556 and 565), bone fragments >10mm were most concentrated in layer 554 along the east wall (Figure 6.17), and thus may have been imported within the matrix of this floor layer when it was laid; however, this pattern of deposition east of the hearth tallies with that for House 700 in phase 3 (see Figure 5.5) so it could have resulted from long-lived routines followed in successive houses. High densities of mammal bone fragments were also found within the hearth and in the northeast corner of the forecourt, where bone fragments mingled with broken iron objects.

The highest concentration of bone fragments >10mm in the later floor (504) was around the hearth, especially towards the north end on the west side (Figure 6.22) where a hammerstone and other stone tools were located (see Figure 6.19), and may be the result of bone breakage to extract marrow or other such activities. Interestingly, the main area of sherd debris, in the northeast of the main room, had a relatively low density of bone fragments. There was another concentration of bone fragments just south of the east doorway.

In the earlier floor (370, 539, 554, 555, 556 and 565), unburnt mammal bone fragments <10mm were distributed throughout the house floors except for the central spine of the hearth (where burnt mammal bones were concentrated; Figure 6.17). Fragments are slightly concentrated south of the east doorway, with low numbers in the southwest corner of the room. Similar patterns are found for unburnt mammal bone fragments <10mm in the later floor (504), except that the southeast is more dense and the southwest more sparse (Figure 6.22).

High concentrations of burnt mammal bone are found south of the hearth in both the earlier and later floors (Figures 6.17, 6.22), partly explicable as material swept towards the doorway. However, the high concentration in the southwest corner in the later floor contrasts with the scarcity of unburnt bone in this sector.

Fish bones

Similar distributions were observed for both burnt and unburnt fish bones in the earlier floor, with unburnt fish bones denser in the doorway and the forecourt, as well as at the north end of the hearth (Figure 6.17). Burnt fish bones (Figure 6.17) were concentrated along the spine of the long hearth, at the south end of the hearth near the doorway, and in the southwest corner of the room.

For the later floor, the greatest quantities of unburnt fish bones (Figure 6.22) were found in the north end of the main house, extending into the south half of the north room, as well as around the edges of the hearth and in the doorway. There was an unusually high concentration against the south wall. Burnt fish bones in this later floor (Figure 6.22) were also found in quantity against this south wall and in the doorway as well as in the northeast corner of the hearth.

Crab, crustaceans and eggshell fragments

Crab and crustacean fragments were mostly concentrated in the northeast corner of the long hearth in both earlier and later floors (Figures 6.17, 6.22). In the later floor, they are distributed mostly around the hearth with smaller concentrations in the northwest corner of the main house and in the eastern half of the north room.

Eggshells, identified as those of chickens, were densest around the hearth, especially in the middle of its west side (Figures 6.17, 6.22). This distribution was broadly the same for both earlier and later floors.

Stone

Worked flint

There are 40 struck flakes and worked nodules from House 500, of which the vast majority were found in and around the hearth (Figures 6.18, 6.20, 6.22). A strike-a-light and a flake came from floors 366 and 370 in the north room (Structure 353).

Small pieces of struck flint <10mm in the earlier floor (Figure 6.18) were concentrated in the middle of the hearth's west side. In the later floor, these tiny chips were concentrated in the northeast of the hearth and along the house's west wall (Figure 6.22). A slight cluster in

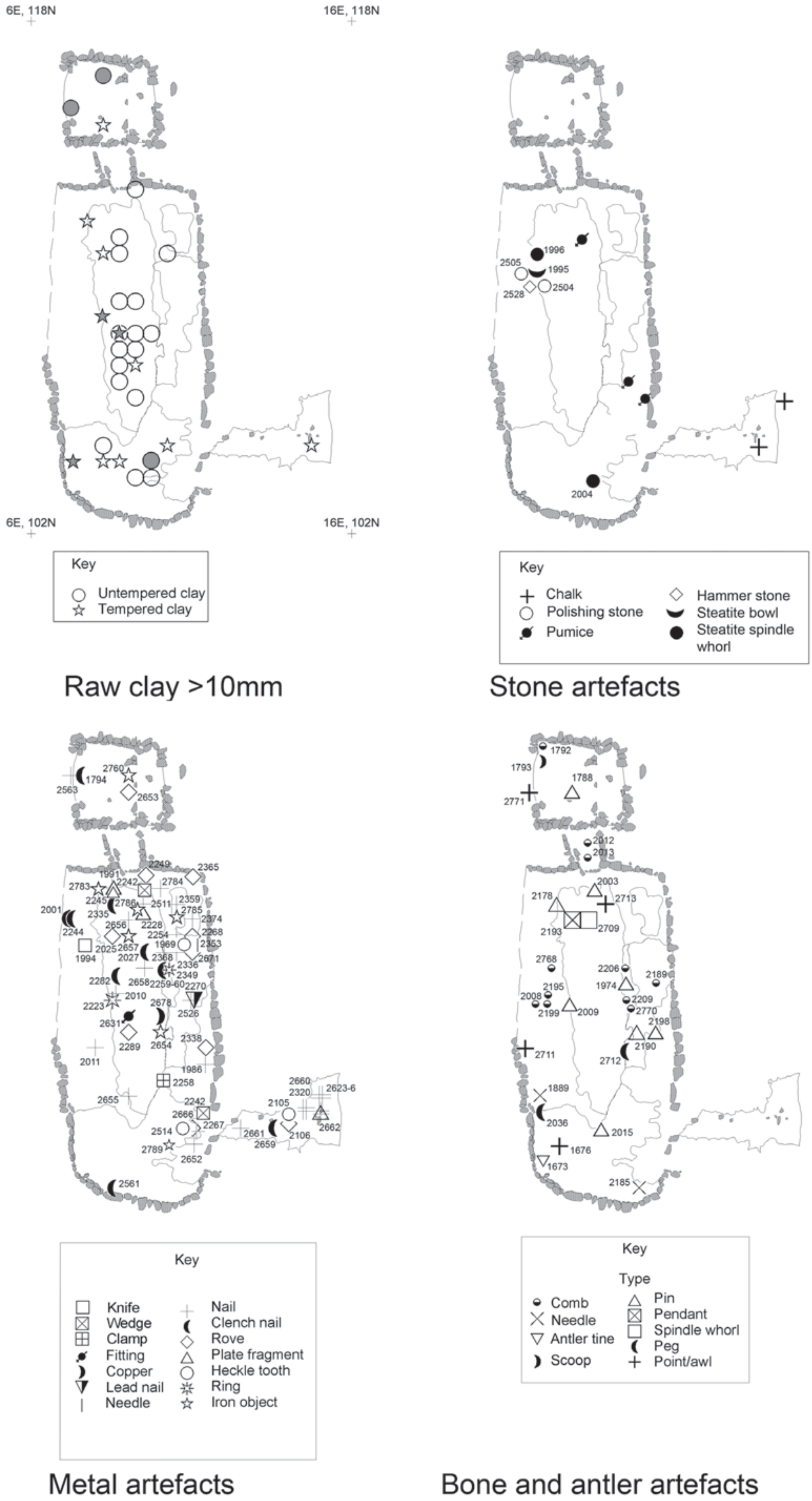


Figure 6.19. The distribution of clay and artefacts of stone, metal and bone in the lower and upper floors combined of House 500

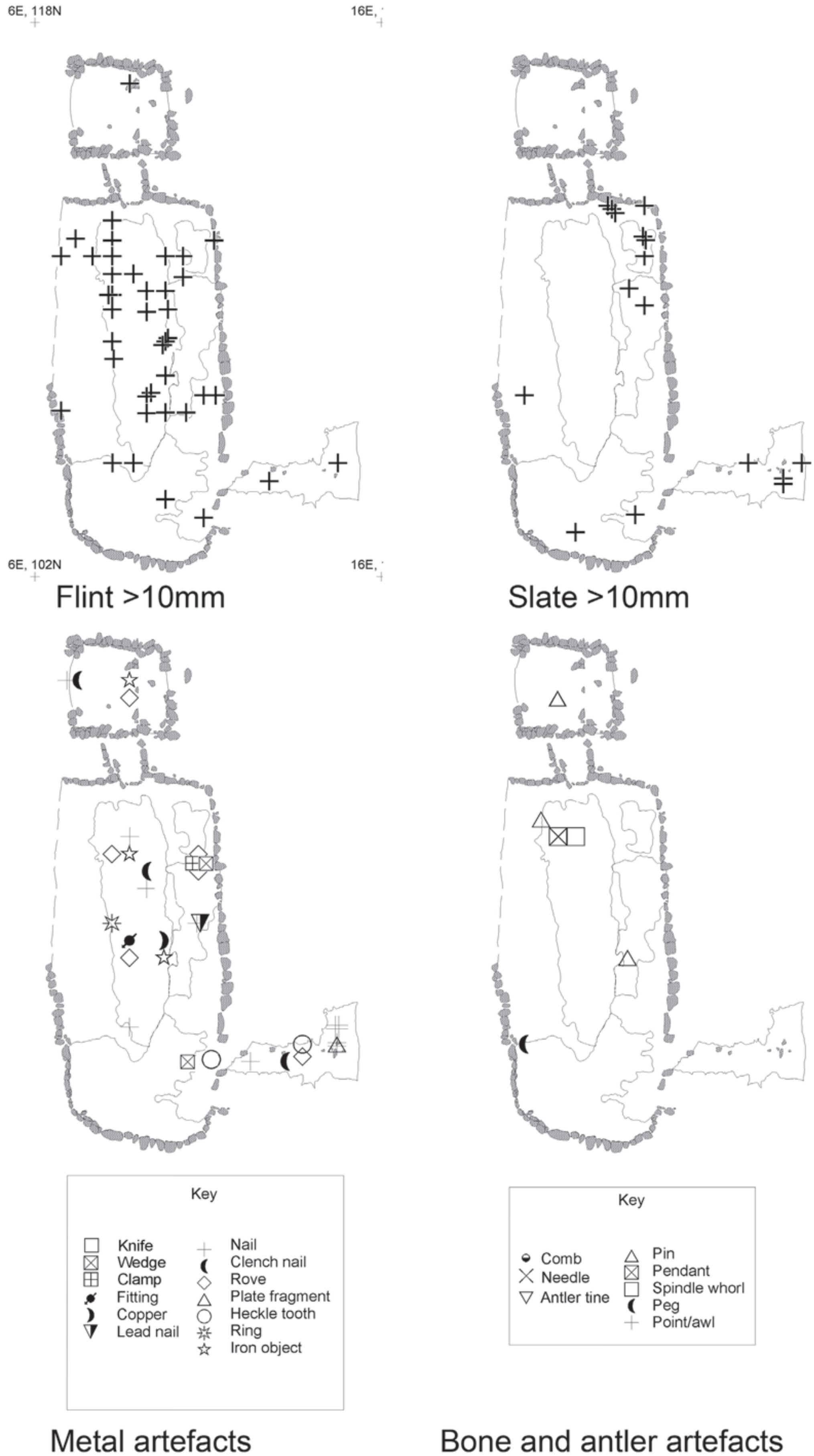


Figure 6.20. The distribution of flint, slate, metal artefacts, and bone and antler artefacts in the lower floor of House 500

the southeast corner of the house might be the result of sweeping towards the doorway. The concentrations of small flint debris <10mm within the hearth may indicate the spots where the house's occupants lit the fire.

Stone tools

The only stone tools from the later floor are a steatite spindle whorl (SF 2004) in the south end of the house, and a piece of chalk from the forecourt (Figure 6.19).

All of the non-flint stone tools from the upper floor were found in a small area of the house, towards the northwest end of the hearth (Figure 6.19; Table 6.1). The assemblage consists of two polishing stones (SFs 2504 and 2505), a hammerstone (SF 2528), a fragment of a steatite bowl (SF 1995) and a steatite spindle whorl (SF 1996).

The stone tools in the upper floor indicate a localized area where certain activities (pounding, polishing and spinning) were carried out, differing from those cooking duties (indicated by the dense concentrations of sherds) taking place in the north and northeast areas of the house. A broken iron knife (SF 1994) also lay here (see Figures 6.19, 6.24). Some of the complete items might have been deliberately placed here on abandonment as 'closing' offerings.

Pumice

Three of the 14 pieces of pumice from the site came from the floors of House 500 in phase 4 (Figure 6.19) and a fourth was found in the southeastern midden in layer 133. One piece (from 555) was located at the north end of the hearth, amongst a dense group of sherds. The other two pieces from the house floors were found in the later floor layer (504) close to the east wall, in the southern part of the bone concentration midway along that wall.

Pumice has been found on prehistoric sites excavated in South Uist in much higher quantities than is seen at Cille Pheadair, for example at Dun Vulan (Parker Pearson and Sharples 1999: 232) and Cladh Hallan (Parker Pearson *et al*. in prep.), but its use appears to have declined by the Late Iron Age at Bornais (Sharples 2012b: 80–1). Pumice was evidently much more widely used in the Middle Iron Age and earlier, perhaps for the treatment of hides, and its utility as a tool had probably diminished by the Norse period.

Slate

In House 500's earlier floor, the distribution of green slate fragments is broader than the distribution seen in floor 701 (phase 3), with most pieces found in the northeast corner and in forecourt, although the majority of the slate fragments are from the northeast corner (Figure 6.20). These fragments may derive from sheets of slate used as pot-lids and as flat surfaces for food preparation. Slate fragments in the later floor are fewer but mostly concentrated in the northeast corner (Figure 6.24).

Pebbles

From within the main room of House 500, there are over 250 pebbles from its various floor layers. Most of these were found clustered within the northeast quarter of the house and in the area of the hearth, with two other small clusters in the central west and northwest parts of the main house. There were very few pebbles in the south end of the house or along its west side. Equally, they were not distributed against the insides of the walls, suggesting that these pebbles had not been swept to the foot of the walls, as one can presume they would have been were they considered as impediments to movement. Nor did the pebbles collect around the doorway as the result of sweeping, though they are present along the entrance passage and were found in large numbers in the northeast corner of the forecourt (25 white, 25 black and 2 orange within just three sample squares). This little group in the forecourt could constitute sweepings but it might also have been a children's cache of improvised counters.

The densest concentration of pebbles from within the house came from the northeast quarter, 2m from the north wall and 1.50m from the south wall, where 20 pebbles were found in a single half-metre sample square. There was clustering of white pebbles immediately south of this concentration, over an oval area 2.0m north–south and 2.50m east–west.

Those pebbles from the later floor (504 and 366) are not particularly concentrated in any area but the distribution of colours (Figure 6.24) is intriguing. Concentrations of white pebbles, as contrasted with grey pebbles, appear to occur in alternate bands down the east side of the house. The pebbles might thus have served to define different zones, possibly equating to seating positions along the hearth.

Within the north room (Structure 353), in both floors 366 and 370, there were eight white pebbles and 173 grey pebbles. The scarcity of white pebbles and the large quantities of grey ones within this room are remarkable. Although grey pebbles are also most numerous within the rest of House 500 (171 grey pebbles), the ratio of the two colours is quite different, since the main house also produced 123 white pebbles. The overwhelming numbers of grey pebbles from floors 366 and 370 therefore form a striking contrast to the grey:white ratio in the main house and further highlight the spatial significance of colour differences.

Within floor 366 the pebbles were concentrated within the centre of the north room. In the lower floor – floor 370 – they were also densest in the room's centre but were also distributed in its western part. The very large numbers of grey pebbles in these floors may relate to the storing of seaweed in this north room, with the stones perhaps having been brought in attached to the dried seaweed. It is worth commenting on the presence of a small cache of 30 white and 12 grey pebbles from layer 574 beneath the floor of the passage connecting this north room with the rest of the house.

Iron and other metal artefacts

A large number of iron artefacts came from the floors of House 500 (Figures 6.19–6.20, 6.24).

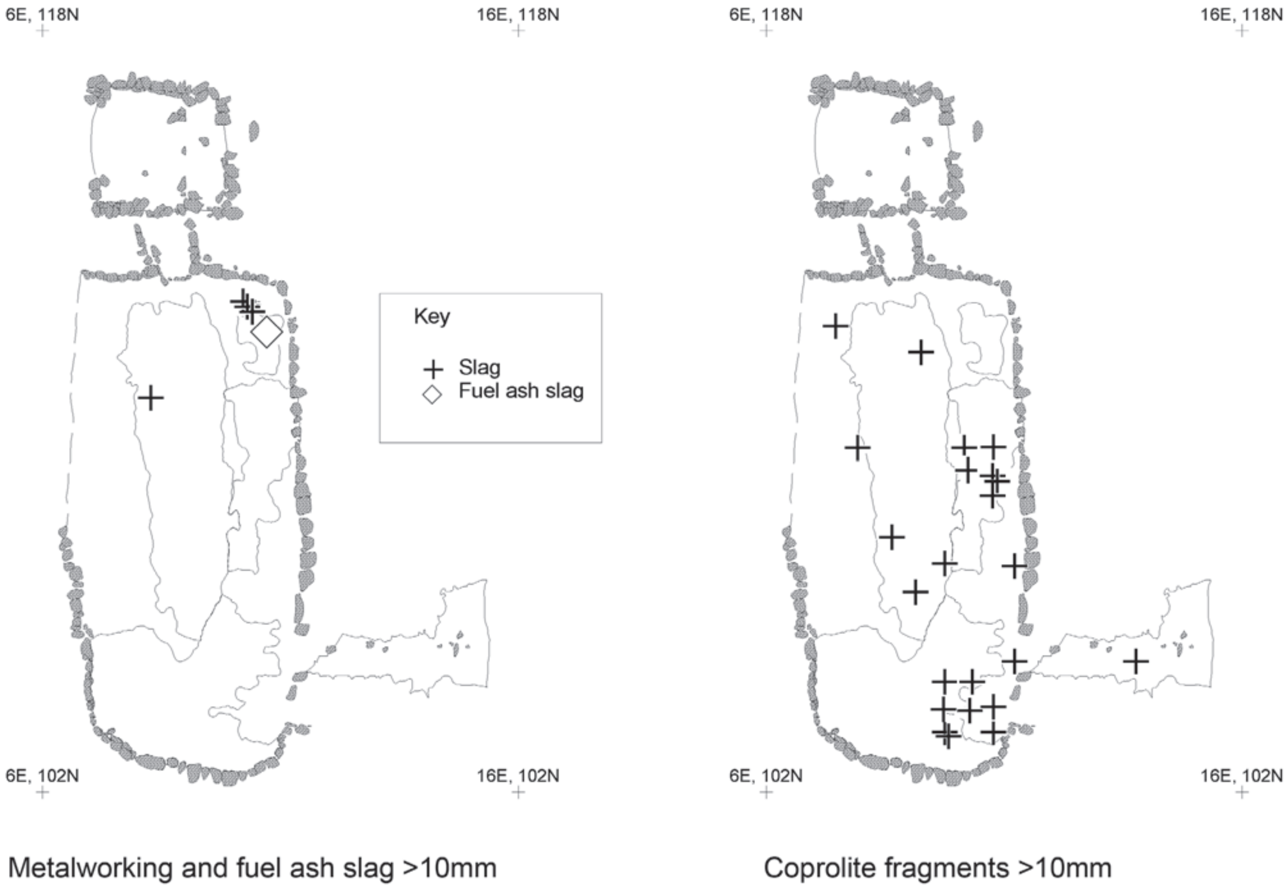


Figure 6.21. The distribution of ironworking and fuel ash slag, and coprolites in the lower floor (370, 539, 554, 555, 556, 565) of House 500

Nails

Unlike the distribution of broken nails in floor 701 (distributed in the south end and in the northern half), those in House 500's floors were concentrated in the forecourt and in the hearth area in the earlier floor (Figure 6.20), and in the northeast corner of the main room, in the southeast by the door, and on the west side of the long central hearth in the later floor (Figure 6.24). The north room's floors contained just three nails. The positions of the nails in House 500 more likely reflect rubbish management rather than the arrangement of furniture or wooden fittings.

Clench nails and roves

About a third of the nails from within House 500 and its north room were identifiable as clench nails. These nine clench nails and 13 roves were mostly distributed across the northern half of House 500 (with a few in the north room) in both the earlier and later floors. It is most likely that they were residues of planks burnt as firewood on the hearth. One lead clench nail was also found in layer 554.

Broken iron artefacts

The deposits on and in the hearth sequence contained more than 20 iron items – a broken fitting, nails, clench nails and roves – which might have been attached to wood burnt on the fire. The 'sweeping debris' by the doorway contained the tooth of an iron flax heckle and another had reached the entrance passage. A few roves and clench nails ended up against the walls of the main house, perhaps tossed there, although there seems to have been little systematic removal of sharp iron objects from the floor in general.

Amongst the more unusual ironwork is a ring (SF 2223) from the earlier floor west of the hearth, a clench nail for furniture (SF 2282) from the later floor west of the hearth, and a broken wedge (SF 2242) from the later floor at the north end of the main room. The fragments of iron plate were also found in this northern area, with one piece coming from the entrance passage.

Eleven pieces of ironwork from the entrance passage and three from the forecourt of the house are presumably the result of sweeping out. In the north room, a nail and a rove came from the east side of floor 366 (positions not recorded) and five iron items from across the floor 370 (positions of four out of five recorded).

Bone and antler artefacts

A variety of complete and broken bone and antler artefacts were found on the floors of House 500 (Figures 6.19–6.20, 6.24). There were relatively few in the earlier floor (Figure 6.20). In the later floor comb fragments were found on both sides of the central area of the hearth and a single

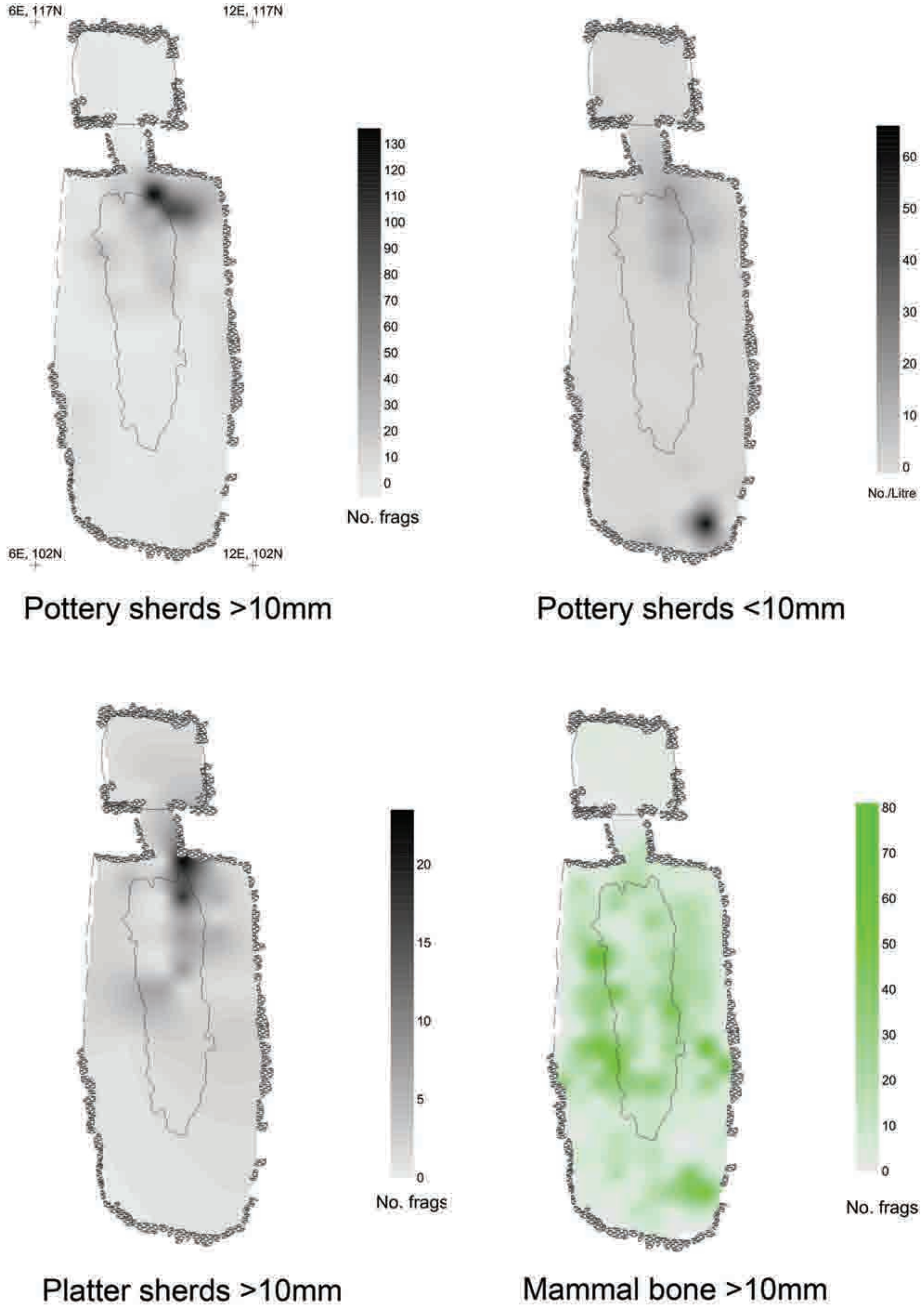


Figure 6.22. The distribution of pottery, mammal bone, fish bone, crab, eggshell and flint in the upper floor (504, 366) of House 500 (continued over the next two pages)

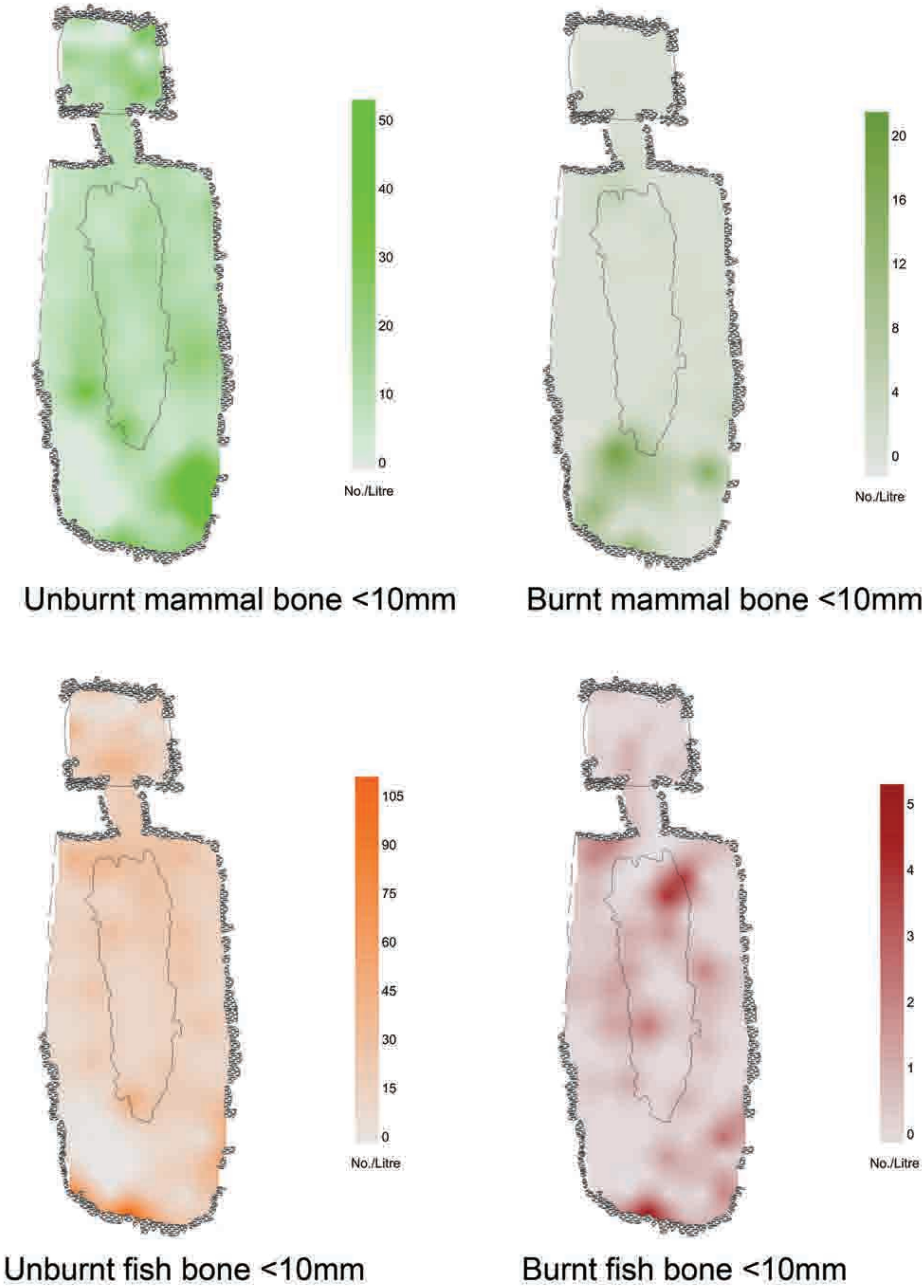


Figure 6.22. (continued from the previous page and on the subsequent page)

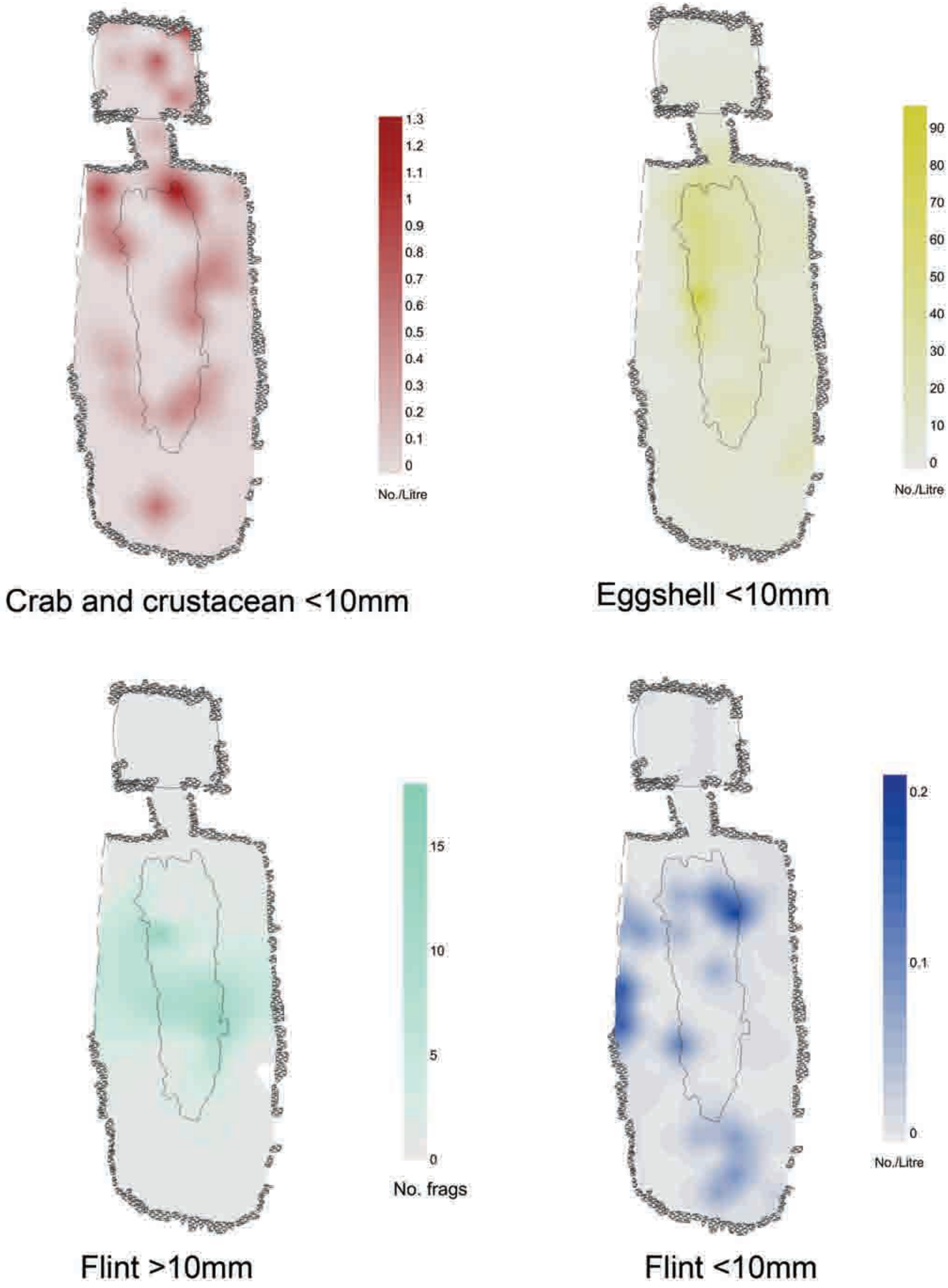


Figure 6.22. (continued from the previous two pages)

fragment was found in the northwest corner of the north room in floor 366 (Figure 6.24). Bone pin fragments were found all around the hearth.

Complete artefacts

The arrangement of a comb and pin north of the hearth in floor 701 (see Figure 25.4) was replicated in House 500, except that the comb was broken into two (SFs 2012 and 2013) and discarded in the passageway to the north room. The pin (SF 2003; see Figure 6.10) was found to the south of the comb (see Figure 25.5). The other complete artefacts include the iron ring, found in the west side of the hearth, and two steatite spindle whorls, discussed above.

To their west, in the zone between the 'cooking' area and the stone tool/bone fragmentation area (see Figures 6.22 [pottery distributions] and 6.19), lay another complete bone pin (SF 2178) and a bone cross pendant (SF 2193) set into the ashes of the fire (see Figure 6.10). These items were most likely placed here deliberately as closing deposits.

Two complete bone points (SFs 1676 and 2711), a broken needle (SF 1889), a complete peg (SF 2036) and an antler tine (SF 1673) were found in the southwest of the main house, away from most of the other artefacts and debris; their distribution hints at craft activities in this otherwise bare part of the building.

Iron-smithing slag, fuel ash slag and hammerscale

Eight pieces of iron-smithing slag and one of fuel ash slag[3] were found on the floors (Figures 6.18, 6.21, 6.23, 6.25). In the main room four pieces of slag and a piece of fuel ash slag >10mm were found in the northeast corner (Figure 6.21). A single piece of slag came from the northwest side of the hearth. In the north room two pieces of slag came from floor 370 (not plotted) and one from the centre of floor 366 (Figure 6.25).

Of the material <10mm, fragments of iron-smithing slag were rare within the house but there were two slight concentrations within the north and south ends of the hearth (Figures 6.21, 6.25). In contrast, quantities of hammerscale were densest in the northeast corner of the house (Figures 6.18, 6.23). The small quantities of slag and hammerscale indicate that neither derives from iron-smithing activities within the house.

The distribution of fuel ash slag <10mm is more widespread than that of smithing slag, with four concentrations in the northeast and south parts of the house (Figures 6.18, 6.23).

Spirorbis and carbonized seaweed

As discussed in Chapter 5, the distribution within the house of *Spirorbis* and seaweed (Figures 6.18, 6.23) is likely to relate to the storage and use of fire-lighting material in the form of dried seaweed utilized as tinder to light fires or to rekindle dormant fires. The distribution of burnt and unburnt *Spirorbis* fragments shows concentrations in the northeast corner of the house as well as in the north room. Carbonized seaweed fragments are similarly concentrated in the northeast corner but also at the southeast of the hearth towards the doorway (Figure 6.18).

Dog coprolites

One of the greatest surprises during analysis of House 500's floors was the large number of dog droppings from them (Figures 6.18, 6.21, 6.25). Twenty-one different sampling squares within layers 503 (phase 5), 504, 539, 544, 554, 555 and 565 produced coprolite fragments, with more material coming from layers 553 and 569. This was utterly different to the almost entirely clean floor of House 700 and the clean floors of later dwellings (Houses 312 and 007 in phases 7 and 8).

It appears that House 500 was kept in this unwholesome state throughout its entire use, both in phase 4 and phase 5, since the coprolite-containing layers span the stratigraphic sequence of these floors across both phases. House 500 was evidently shared with dogs for perhaps all of its life. The sweeping-out of their droppings seems not to have been very efficient although the faeces might have accumulated during periods of floor renewal.

Indeed, it seems most plausible that the floors of House 500 accumulated dog faeces during the periods immediately prior to each renovation or re-laying of the floors as well as after the end of its Stage II (*i.e.* phase 5) occupation. Within the north room (353), dog coprolites were found in floor layer 370 and, higher up, in the fill layer 358. The fragments from floor 370 indicate that dogs were certainly present within the north room during occupation and were able to penetrate into its deepest recesses.

6.5 Soil micromorphology of the house floor, floor of the north room, wall construction and midden

C. Ellis

Structure 353: the north room

Layer 370 – Sample MM15 6877 [371] and Sample MM12 6876 (Figure 6.4)

Layer 371, identified as a hearth in the centre of floor 370, within the confines of the thin section comprises a series of discontinuous laminations with at least eight separate episodes of deposition. The bulk of the context comprises windblown sand, with ash (derived from peat and/or turf) occurring as a thin coating on mineral grains as well as very rare clasts of turf ash. Two broken laminations comprise micrite, intermixed with very few charcoal fragments and silt-sized charcoal; these are interpreted as disturbed layers of re-deposited, weathered, wood ash.

The micromorphological evidence indicates that these deposits are derived largely from sand that has been mixed with ash residues, rather than the *in situ* accumulation of hearth ash deposits. The mode of formation of the deposits

remains elusive. The boundaries between the laminations are sharp and prominent, indicating sudden changes in the source of material, rather than a significant hiatus in sedimentation. Within the laminations there is a weak preferred orientation of the elongated mineral grains and shell fragments with the angle of dip averaging around 15°, demonstrating that the deposits accumulated on a predetermined slope.

Next in the sequence is layer 370 (identified as a floor during excavation), the basis of which is windblown sand. The majority of the sand grains – quartz, feldspar and shell fragments – are coated or bridged by a fine matrix of amorphous organic matter mixed with silt-sized charcoal fragments and very few rubified fine mineral materials; the latter is a mixture of ash residues and decomposed organic matter. The decomposition of organic matter is also attested by the presence of sclerotia, mycorrhizal sheaths and fungal spores. Sclerotia are commonly found in organic layers associated with mineral horizons (*i.e.* in the litter layer or the topsoil), but they are also common within peat layers (FitzPatrick 1993).

The occurrence of very few fragments of bone, including probable fish, indicates a domestic origin for this fine material. The fabric of the context has been disrupted by soil biota, but this may also be a function of the trampling of the deposit, as is perhaps the slightly more compact nature of this floor in comparison to the essentially undisturbed windblown sands.

House 500

Layers 504, 520 and 526 – Sample 7302 (Figure 6.4)

The medium windblown sand of layer 526 is mixed with various ash residues, dominated by burnt dung with minor amounts of wood and grass ash. The fine material is scattered with silt-sized calcite spherulites, which are produced in the digestive tracts of herbivores (Canti 1997). As the dung is burnt or at least mixed with silt-sized fragments of charcoal, it is not immediately apparent that this deposit is an *in situ* byre floor, although ashes have been reported as used to soak up and neutralize urine within animal stalls (Adderley *et al.* 2006). This layer is capped by a thin spread of charred amorphous organic matter that is incompletely combusted (520). This deposit appears to be a charred peat-like material within which there are a few calcareous spherulites; this material may be charred animal bedding. The upper band (504) comprises a medium sand mixed with turf and peat ash and is discussed in more detail below.

Layers 504 and 544 – Samples MM7, MM8, MM10, MM9, 7299 (Figure 6.4)

Layer 504 comprises a fine sand, with charred amorphous organic matter and various other ashes including peat, turf, wood and dung (cow?). The high ash content of this context is reflected in the dearth of sand-sized shell fragments (approximately 2%) compared to the quantity of such fragments observed in those deposits with a significant windblown sand component (50–70%), although the charred amorphous organic ashy deposits do contain some shell grains (10%), indicating the incorporation of shell sand, perhaps resulting from the cattle grazing on machair grass.

Few fragmentary phytoliths occur in much of the charred amorphous organic matter, indicating that much of this material is likely to be derived from grasses (in the broadest sense). Calcite spherulites are also present in this material. The actual dung clasts comprise black, fragmented organic matter, while some of the cow dung ash comprises very fragmentary charcoal with a phosphate-rich fine mineral material (yellow in PPL and OIL) within which are minute calcite spherulites. A very fragmentary clast with rounded bone fragments and a phosphate-rich matrix and a few mineral grains is interpreted as a part of a carnivore coprolite (cat/dog/owl?).

Some of the wood ash has been subject to slight chemical weathering and occurs as fragmentary, near-horizontal bands. Another band of weathered, micritic wood ash forms a lining to what must have been a small hollow (20mm dia.) in the sediment surface. In MM8 the horizontal layers comprise peat ash, overlain by charred amorphous organic matter, overlain by grass ash (the diatoms indicate that it derived from a damp source), which is capped by another layer of charred amorphous organic matter.

Thus, the micromorphological evidence indicates that a mixture of fuels was being utilized. The presence of burnt dung indicates that it too was being deliberately utilized as a fuel; although the carnivore coprolite is much more likely to have been an accidental inclusion. The ashes were all produced on a low-temperature fire.

MM9 comprises a windblown sand (600, a phase 2 levelling layer; see Chapter 4.5) overlain by layer 544=504. In this sample, however, this part of layer 544 is dominated not by ash but by windblown sand. The ash content mainly coats and bridges the mineral grains but also occurs as small, rounded clasts, suggesting that the whole unit is re-deposited. The ash is of mixed origin, including charred amorphous organic matter and peat, with very few clasts of burnt turf. Again, the presence of small, burnt bone fragments indicates a domestic source for the ash.

The summary sequence of accumulation in Sample 7299 (layer 504=544) is: windblown sand capped by a thin layer of wood ash (2mm); a thin layer of turf or sandy peat ash (3mm); a band of windblown sand with a high turf ash content and occasional clasts of wood ash (17mm); a layer of peat ash within which there is a band of peat that has not been burnt but charred on its outside edges (12mm); capped by a final microlaminated layer of mixed turf, peat and wood ash. Again, these ashes are the product of low-temperature fires. The incomplete combusted peat band contains minute fragments of burnt bone and one explanation is that the peat fuelled a low-temperature fire.

There appears to be considerable lateral variation in the sedimentary fabric of layers 504 and 544, with sequential

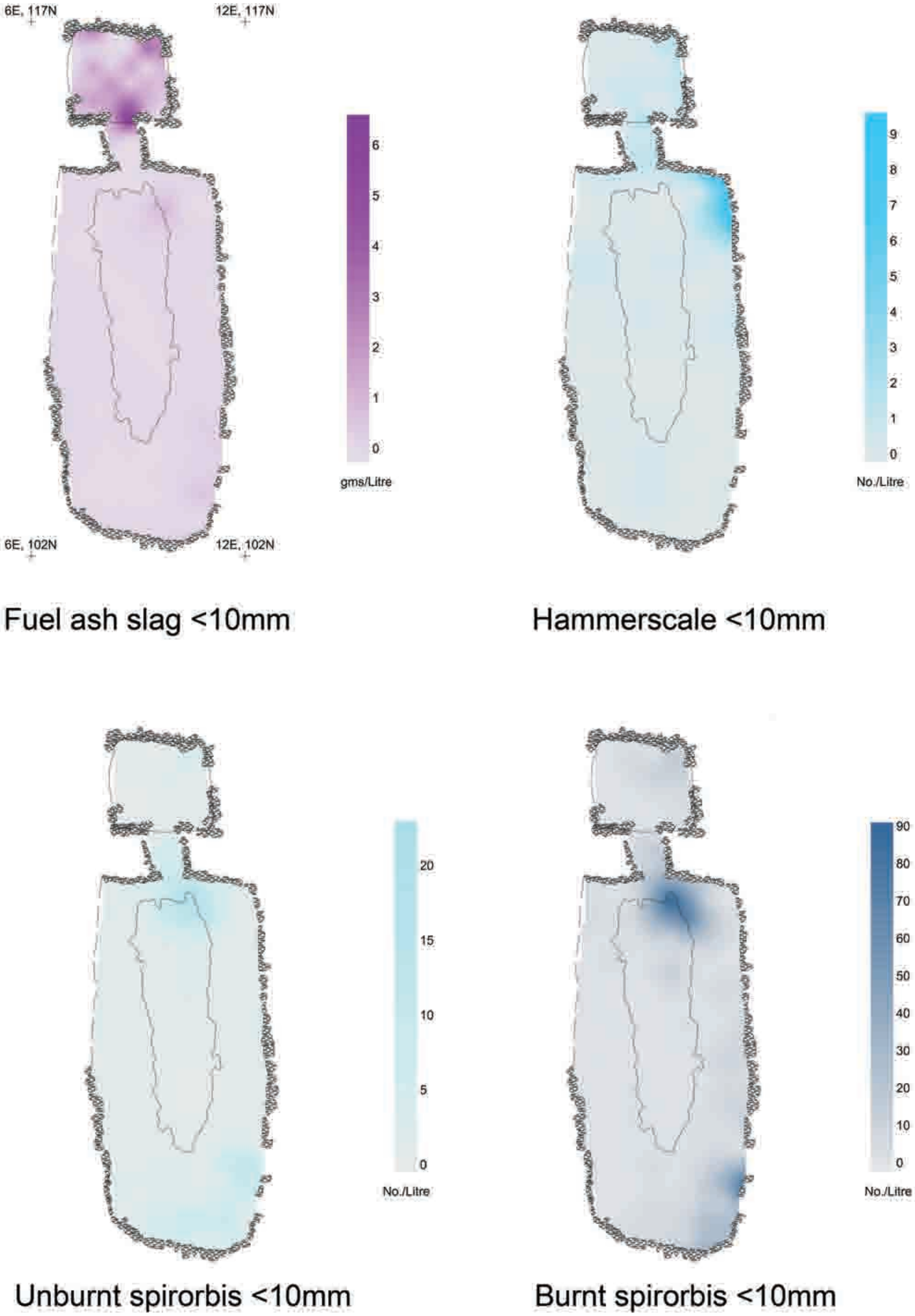


Figure 6.23. The distribution of fuel ash slag, hammerscale and Spirorbis in the upper floor (504, 366) of House 500

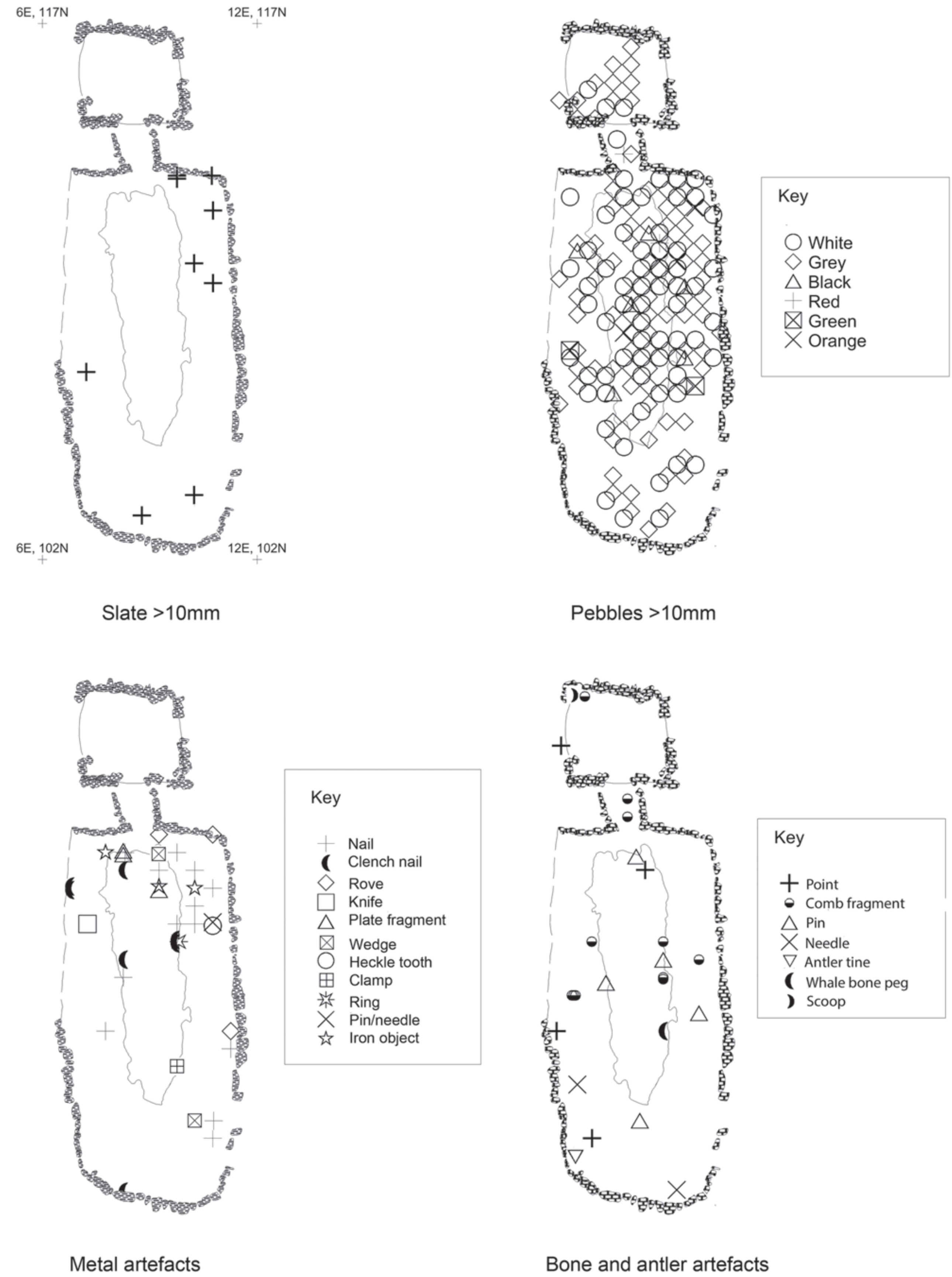


Figure 6.24. The distribution of slate, pebbles (schematic by presence rather than number), metal artefacts, and bone and antler artefacts in the upper floor (504, 366) of House 500

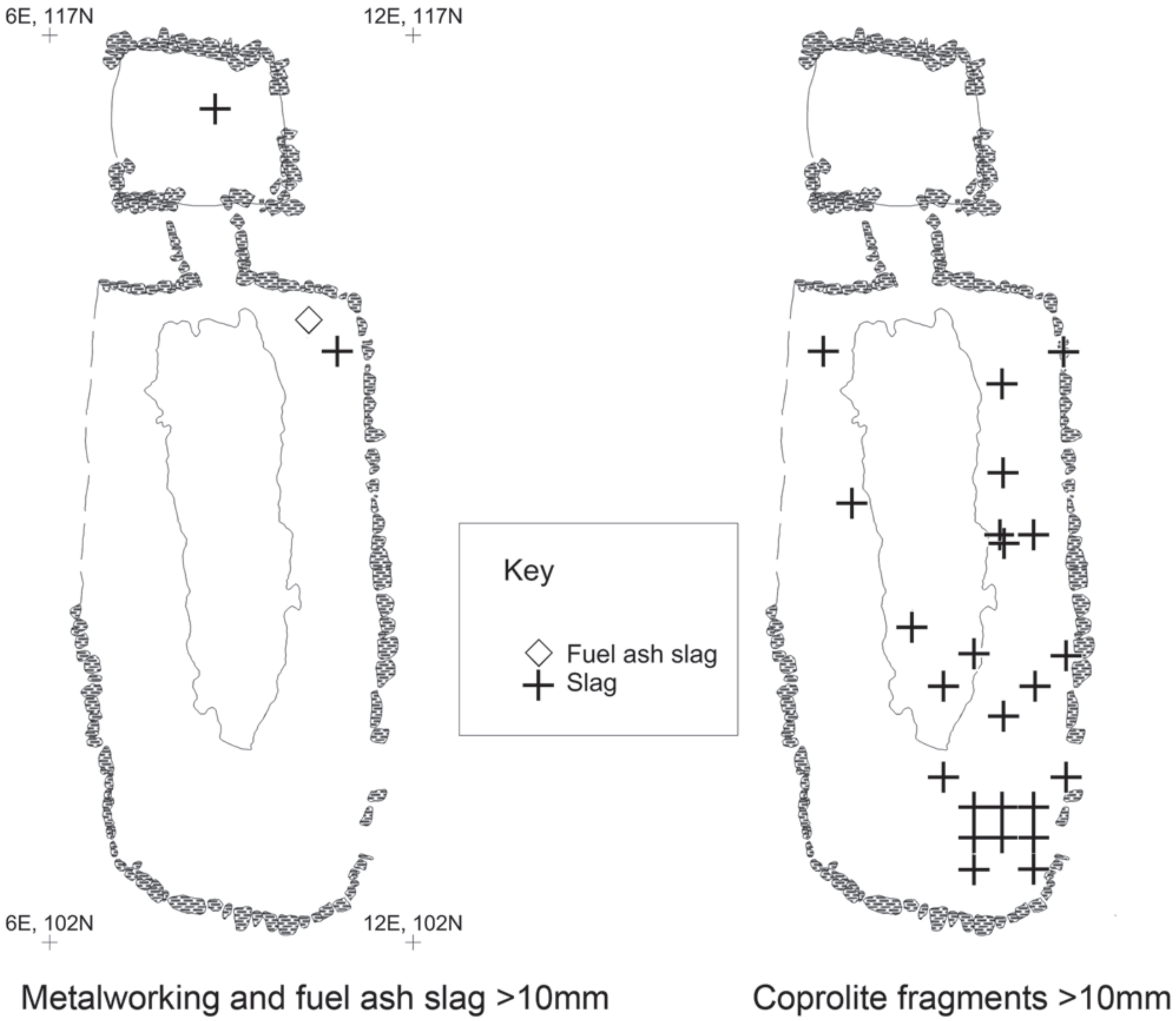


Figure 6.25. The distribution of ironworking and fuel ash slag and coprolites in the upper floor (504, 366) of House 500

horizontal accumulation clearly evident in some samples and absent in other. The survival of sharp and prominent boundaries demonstrates that the deposits accumulated in a series of sequential layers. Furthermore, the survival of separate bands of ash and windblown sand (*e.g*. MM8 and Sample 7299) strongly indicates that, certainly in places within House 500, the depositional surfaces were not subject to significant disturbance, such as that caused by trampling by animals or humans. However, elsewhere (*e.g.* samples MM7, MM9 and MM10) there are no surviving or significant less well-defined microlaminations and, if originally present, their destruction could well have been due to surface trampling.

Wall construction deposits

Layers 224 and 225 – Sample 7659

Sample 7659 comprises layers 225 and 224 and is described as machair turfs forming the lowest part of the turf wall of House 500. Of the three units visible, the lower and upper comprise windblown sand with very few inclusions of anthropic origin (ash, fragments of herbivore dung and bone) that have been incorporated through aeolian processes. These two layers bound a thin (2mm) band of amorphous organic matter that contains a few phytoliths, bone fragments and very few silt-sized fragments of charcoal. This layer has less than 2% shell fragments and around 40% medium sand-sized quartz/feldspar grains, a mineral content typical of an ash. The band can be interpreted as a thin deposit of charred sandy material possibly derived from a smouldering fire.

The northeastern midden

Layers 320 and 317 – Sample 7493

The sample comprises two bands of windblown sand (midden layers 320 [phase 3] and 317 [phase 4]; Figure 5.11) distinguishable by a diffuse but distinct boundary and the presence of slightly more re-deposited fine peat ash, as well as a few bone fragments in the upper unit (317).

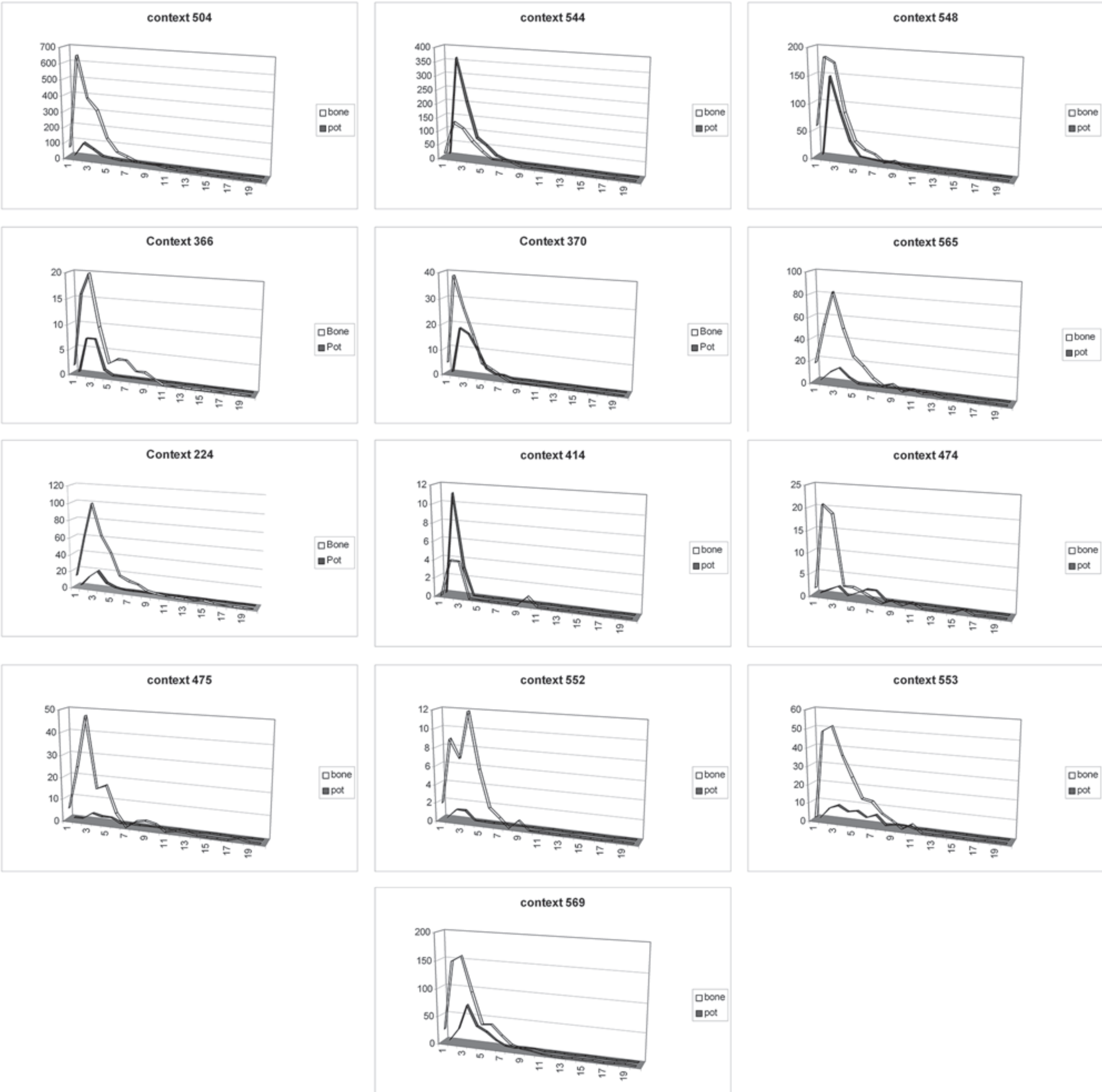


Figure 6.26. The fragmentation of sherds and bones in phase 4 floor layers (504, 544, 548, 366, 370, 565) and construction layers (224, 414, 474, 475, 552, 553, 569)

The ash material in both contexts occurs as irregular intergrain microaggregates and as sand-sized clasts mixed with mineral grains. The source of the ash material might well have been different for 320 (phase 3) and 317 (phase 4). The ash has been eroded and rolled by aeolian processes prior to its final deposition within the windblown sand deposits.

The lack of a sharp boundary between the two contexts may be explained by the mixing activities of soil biota, shared mineralogical composition and continuous sediment accumulation but accompanied by a slight change in the source material.

The southeastern midden

Layers 136, 135 and 133 – Sample 7660

All three units contain a large proportion of windblown sand mixed with sandy peat and turf ash, as well as domestic refuse including small fragments of bone. The sharpness of the boundaries between the units is a consequence of a sudden change in the source of the material as opposed to truncation and erosion. The windblown sand of layer 136 contains minimal quantities of ash and is capped by sand with a much higher sandy peat/turf ash content mixed with very few clasts of burnt herbivore dung and burnt omnivore/carnivore coprolite. This layer is, in turn, capped by another

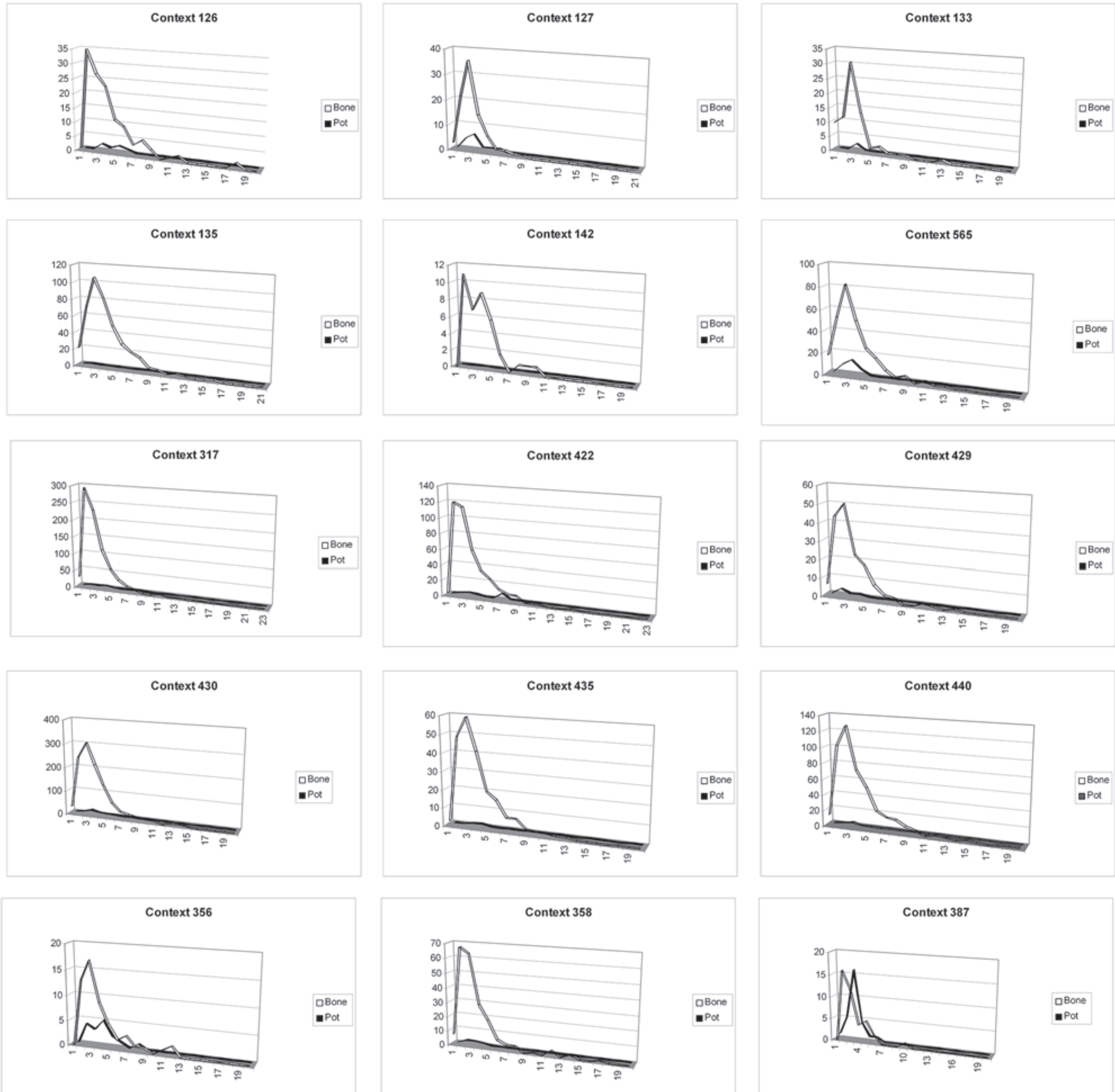


Figure 6.27. The fragmentation of sherds and bones in phase 4 southeastern midden (126, 127, 133, 135, 142, 565), northeastern midden (317, 422, 429, 430, 435, 440) and fills (356, 358, 387)

windblown sand with occasional inclusions of clasts of wood ash, clasts of burnt turf and a general scattering of sandy peat/turf ash between the quartz, feldspar and shell sand grains.

6.6 Artefacts and other remains from the house and its associated deposits

M. Parker Pearson with J. Bond, C. Paterson, E.J. Pieksma, J. Mulville, C. Ingrem and P. Austin

The assemblages of artefactual and other material of phase 4 are considerably larger than those belonging to earlier phases. The bulk of the material was deposited on the floors of House 500 but substantial quantities of artefacts and bone debris were also found in the five further types of context listed below

Fragmentation

Six types of context can be examined in phase 4. These are:

- floors, including hearths (Figure 6.26);
- construction layers (Figure 6.26);
- midden layers (in the southeastern, eastern and northeastern middens; Figure 6.27);
- the standing turf wall of the house (Figure 6.26);
- pits;
- fills above the floors of the north room and of the passageway that leads into it (Figure 6.27).

Floor layers

The distribution and spatial patterning of material in the house floors have been discussed above in section 6.4. As expected, the large numbers of sherds and bones from the floors exhibit the extreme breakage patterns (Figure 6.26) already observed for floor 701 in the first house (House 700, phase 3; see Chapter 5.5). Within House 500, floors 504, 548, 544 and 370 exhibit changing proportions of sherds to bone from south to north:

- In the southern half of the main house, the later floor (504=521=531=544=548) contained mostly small-sized bone with very few sherds.
- In floor 548 (present only in the northern half of the house), the numbers of heavily trampled sherds are almost equal to the number of small-sized bones.
- At the north end of the house (layer 544), the number of trampled sherds is much greater than the bone fragments.
- In the north room, floor 370 contained small-sized sherds which are about 30% of the total of bone fragments.

The significance of these differences across the floor has already been discussed above.

Layers 520 and 539 (earlier floor layers in the south end) have similar fragmentation profiles as 504 whilst 556 (northeast corner) and 531 (floor layer in the north end) have similar profiles to 544. Rather less fragmentation has occurred to the bones in 554 although sherd numbers in it are low. As noted in section 6.1, the debris in this layer probably did not accumulate *in situ* but was brought from elsewhere and laid as a floor.

Other anomalous floor deposits are the hearth (555) which produced medium and large-sized bone fragments with almost equivalent numbers of small sherds. The lack of fragmentation of the bones confirms that this hearth was not trampled or walked on. Floor 366 within the north room also produced medium-sized bone fragments (with sherds in the same proportion as in floor 370), perhaps also indicating lack of trample (although the sample is fewer than 100 pieces). The assemblage from the entrance passage and forecourt floor (565) is also made up of medium-sized bone fragments, but with few sherds. Presumably these are the larger bone sweepings successfully ejected from the house.

Construction layers

In contrast to the small sizes of bone fragments in the floor layers and midden deposits of phase 4, the construction layers contained medium-sized bone fragments. There were no bones or sherds at all from 540, 557 and 578 and very little from 570, 571 and 576. Three assemblages (475, 553 and 569) have large numbers of bones (n=>100) and the remainder are medium-sized (n=20–100). Those contexts with sparse, medium-sized sherds are 475, 552 and 557. Those with about 20% sherd:bone ratios are 384, 553 and 569. In layer 414, medium-sized sherds are more numerous than bones. In 474 the sherd numbers are small but the sherds themselves are generally big.

The survival of complete or freshly broken bone/antler artefacts in layers 384 (comb and point), 414 (comb and smashed pot), 474 (comb and point), 475 (pin), 569 (a near-complete comb, two pins, two needles) and 578 (needle) raises the possibility that some or all of these were deliberately deposited as foundation offerings.

Middens

In phase 3 the middens demonstrate a certain degree of variability, suggesting that each might have accumulated from different outdoor activities, each type of activity presumably occurring in the immediate vicinity of each midden area just beyond the eastern edge of the excavation. In phase 4 such differences in terms of fragmentation are not evident although the disposal of artefact types (see below) indicates different sources of rubbish for the southeastern and eastern middens. The analysis of the northeastern midden is merged in this phase with the eastern midden since it has only one layer (317).

- Whereas small-sized bone fragment profiles characterize only the northeastern midden in phase 3, these are present but not dominant in both the southern and eastern/northeastern middens in phase 4.
- Large assemblages of small-sized bone fragments and very little pot came from layer 126 in the southern midden and 317 in the northeastern midden.
- Large assemblages of medium-sized bone fragments and very little pot came from layers 127 and 135 in the southern midden and 429, 430, 435 and 440 in the eastern/northeastern midden.
- No sherds were found with the large assemblage of medium-sized bone fragments in 460 (eastern midden) and only a few large sherds were present amongst the small-sized bone fragments of 422 (eastern midden).
- The medium-sized assemblages (n=20–100) are all from the southeastern midden. All have medium-sized bone fragments except for 142 (small-sized) and those with no pottery are 132, 142, 144, 147 and 562 whilst those with only a few sherds or 20% proportion of sherds are 133 and 565 respectively.

The turf wall

Surprisingly, one of the turf layers (224; Figure 6.26) forming the above-ground portion of House 500's wall at its south end contained large quantities of medium-sized bone fragments and small sherds (about 20% of the number of bones). This suggests that the turf for the wall might have been mixed with the kind of material that could have been removed from a midden or house floor.

Pit fills

The only pit within the house in this phase was the 'safe deposit' under the hearth. Its fill (559) contained small quantities of small-sized bone fragments and no sherds. The two pits north of the house contained medium numbers of small bones and no pot (613) and small numbers of small-sized bone with some medium-sized sherds (615).

Fill layers
The fills in the passageway to the north room (574 and 575) contained medium-sized bone fragments with a few large sherds. Within the north room, the fills above the floors but prior to re-use in phase 5 contained small-sized bone fragments with some small sherds (358), or with equal proportions of medium-sized pottery (387), or medium-sized bone fragments with a 20% proportion of pot (356).

Bone, antler and metal artefacts
The assemblage of artefacts from contexts belonging to phase 4 is much larger than in any earlier phase. As discussed in section 6.4 above, many artefacts were found within the floors of House 500, particularly in the main house. Few artefacts were recovered from the fills covering occupation levels or from the pits or the turf wall of the house. Most were found in the floors, in the construction deposits and in the midden layers.

The middens can be divided into two areas: southeastern and eastern (since 317 is the only layer in the northeastern midden, it is amalgamated into the eastern midden for convenience). The occurrence of bone and antler artefacts differs between these separate midden areas. Comb fragments occur only in the southeastern midden, with the exception of a single fragment from layer 317: combs are absent from the eastern midden. Conversely there are pins, points and a needle from the eastern/northeastern midden but only a single pin fragment and a single piece of worked antler from the southeastern.

Differences between the two areas of midden are also apparent in the distribution of iron artefacts. As in phase 3, the southeastern midden has a limited range of nails, clench nails, roves, plate fragments and strips. The only unusual pieces are two fragments that may derive from a small cylindrical object (see Chapter 15). Conversely, the eastern/northeastern midden yielded two fittings, three knives, a needle, a loop, a small ring and a ferrule. With the exception of comb fragments, the artefacts in the eastern midden most closely match the assemblage from House 500's floors (see section 6.4).

The bone, antler and metal artefacts from the construction deposits are not particularly different in type to those from other contexts. The numbers of combs are slightly fewer than those from floors but several of the combs are largely intact. Numbers of bone pins and needles are similar to those from floors and the eastern midden. A near-complete iron knife from 553 (SF 2058) and fragments of iron bowls, cylinders and fittings (from 553, 384 and 569) and a prehistoric flint scraper from 384 are the only pieces that are out of the ordinary (*i.e.* not nails, clench nails, roves, strips or plates). It is the proportion of complete bone or antler artefacts that is unusual and suggests their deliberate placing as foundation offerings (see above).

Iron-smithing slag and fuel ash slag
The slag from the house floors is discussed in section 6.4 above. There were 18 further pieces of slag from contexts outside House 500 in phase 4. Three pieces came from the northeastern midden (317). Ten came from construction layers (384, 553 and 569), perhaps indicating the area near the northeastern midden as the source of this make-up material. As well as the three pieces in the floors of the north room, there were three from its upper fills (356 and 358).

Ceramics
The major difference in ceramics between this and previous phases is in the large quantities recovered from phase 4 contexts. In particular, the floor layers of House 500 contain the largest quantities of material. Changes in the ceramic assemblage include a widening of the repertoire, with larger numbers of thin vessels and a decrease from phase 3 in proportions of very thick-walled pots. The full range of fabrics is present for the first time. In phase 4 we see the introduction of the rolled rim and, for the platters, the appearance of thin wares as well as of bevelled rims (in-bevelled only since out-bevelled rims appear first in phase 5). The wide range of rim and base diameters of vessels in this phase is probably a function of the number of sherds in the assemblage.

The use of the pottery is little different to that seen in phase 3. However, the average sherd weight falls from 9.7g in phase 3 to 7.5g in phase 4, possibly as a result of greater breakage on house floors. Alternatively it could be due to the larger quantities of platter ware which tends to break into very small pieces. Also the proportion of sherds containing carbonized residues (6%) was less than in phase 3 (14%). The numbers of conjoining sherds were much greater than before, again probably a consequence of the size of the assemblage. The floors had most conjoins, with the construction deposits and middens containing many fewer.

Platter ware
Platter ware is a common element of the ceramic assemblage on the floors of House 500 but it is entirely absent from the middens and, with the exception of single sherds in layers 475 and 576, from the construction deposits. This could be explained by the small numbers of sherds from the midden (n=82) and from construction deposits (n=253) but the average ratio of platter to total pottery in phase 4 is over 1:3.

Clay
Most of the clay from this phase was recovered from house floors, a distribution probably skewed by the extensive sampling of the floors for flotation. From within the middens, the only find came from layer 126 in the southeastern midden, a lump of grey-green potting clay. The largest lump from the whole site (148.2g) was potting clay from layer 414, the sherd-rich pre-floor layer in the southwest corner of the north room. The comb from this deposit might have been a foundation offering and this large lump of clay pre-figures the potting associations later ascribed to this part of the north room.

Cross-joins of the green-glazed pot

M. Parker Pearson and E.J. Pieksma

The sherds of this green-glazed pot (see Figure 12.18) were found in a variety of contexts, with most of the sherds coming from the layers (356 and 387) of House 500's north room and the passageway to that structure, and from the northeast corner of the main house (layers 504, 544 and 531). Some could be refitted and the remainder are single body sherds whose colour and decoration indicate that they are from the same vessel.

- Seven sherds from 356 (SF 1520) and four from 387 join to make a single large sherd.
- A further 12 fragments from different parts of floor layer 544 (in the northeast part of the main house) also join to form a single sherd.
- Another collection of conjoining sherds links floor 531 (main house), fill 356 (north room) and passageway floor 387.
- Single sherds without joins were found in 504 (four sherds) and 544 (one sherd) (both in the main house), and in 356 (SF 1520; three sherds) and 387 (two sherds), with one further unstratified sherd.
- A single sherd was found in layer 313, windblown sand covering the north room (phase 5),
- In addition, two rim sherds that may be from the same vessel were found much higher up the stratigraphic sequence in layers 357 (SF 1432; phase 6) and 009 (SF 1006; phase 7).

Overall, most of these contexts belong to phase 4; most are from the upper layers of House 500 belonging to this phase, whereas the single non-joining sherd from 313 is within phase 5 and the joining rim sherds from 357 and 009 are from phases 6 and 7 respectively. It is likely that the Minety pot was broken and its sherds scattered around the north end of House 500 towards, or at the end of phase 4.

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 4 contexts produced a large assemblage of 1,451 identifiable fragments of mammal bone. The proportion of sheep/goat increases in this phase, with a corresponding decrease in cattle and pig numbers. Other domestic animals present are goat, dog, cat and horse. Wild species are red deer (antler and bones), roe deer (limb bones), seal and otter. For analysis of the small mammal bones from House 500 Stage I, see section 6.7 below.

A large sample containing 1,921 identifiable fragments of fish bone >10mm and 1,954 fragments <10mm of fish bone (total n=3,875) was examined from phase 4 deposits. Again, most of the >10mm material (97%) belongs to cod-family fish, particularly cod and pollack. Herring continue to dominate in the large sample of material <10mm, comprising 96% of the total NISP value. Also present are salmonid, eel, conger eel, wrasse, plaice and flounder.

Wood charcoal

P. Austin

Of the eight taxa identified from wood charcoal in phase 4, Heather was the most widely represented, followed by Pine, Birch and Hazel, then Willow/Poplar and finally Alder, Larch/Spruce and Ash. Apart from the presence of Willow/Poplar in the lowest floor (370) of the north room, the hearth/floor deposits in this structure more or less replicate the hearth deposits within the main house. From the later floor (366) and hearth (383) in the north room, eight taxa were identified in total: Heather, Pine, Hazel, Alder, Willow/Poplar, Ash, Birch, and Larch/Spruce.

6.7 Small mammal bones from the floor of House 500

J. Williams

Small mammal bones recovered from House 500 appear to have been deposited by predators, with most having been deposited by an owl, possibly a tawny owl (*Strix aluco*), during a time when the house was unoccupied. Distribution of the bones within the house suggests that the deposit underwent significant post-depositional modification, most probably linked to sweeping of the house floor when the house was re-occupied.

Results and discussion

Small mammal bones came from three contexts within House 500 – floor layers 504, 544 and 548. The bones were analysed and recorded individually for each sample within each context, and the cranial remains recorded separately for each species. These data are lumped together to provide a generic overview of the assemblage from House 500 (with the data for other areas of the site appearing in Chapter 18.2). The contexts from House 500 yielded a total of 143 small mammal bones; there are 76 cranial elements and 67 post-cranial elements. Bones of small mammals were well represented in floors 504 (MNI=5) and 544 (MNI=7).

The breakage of post-cranial bones from House 500 is slightly higher than is recorded for the total assemblage; only 14% of bones are complete (21 bones), compared with 33%. It should be noted that many post-depositional events can act to alter patterns of pre-depositional bone breakage (Fernandez-Jalvo 1996).

Digestion affected 61% of molars from House 500, of which 25 out of 28 (89%) have become detached from their mandibles. The majority of the digestion (79%) is light or moderate. Digestion occurred on 75% of the 36 incisors from House 500, with 79% of digestion recorded as light or moderate. The results for the whole site, by comparison, are 52% digested molars, with 78% isolated from the jaws, and mainly moderate or light digestion (86%), and 49% incisor digestion, with around 80% light or moderate digestion.

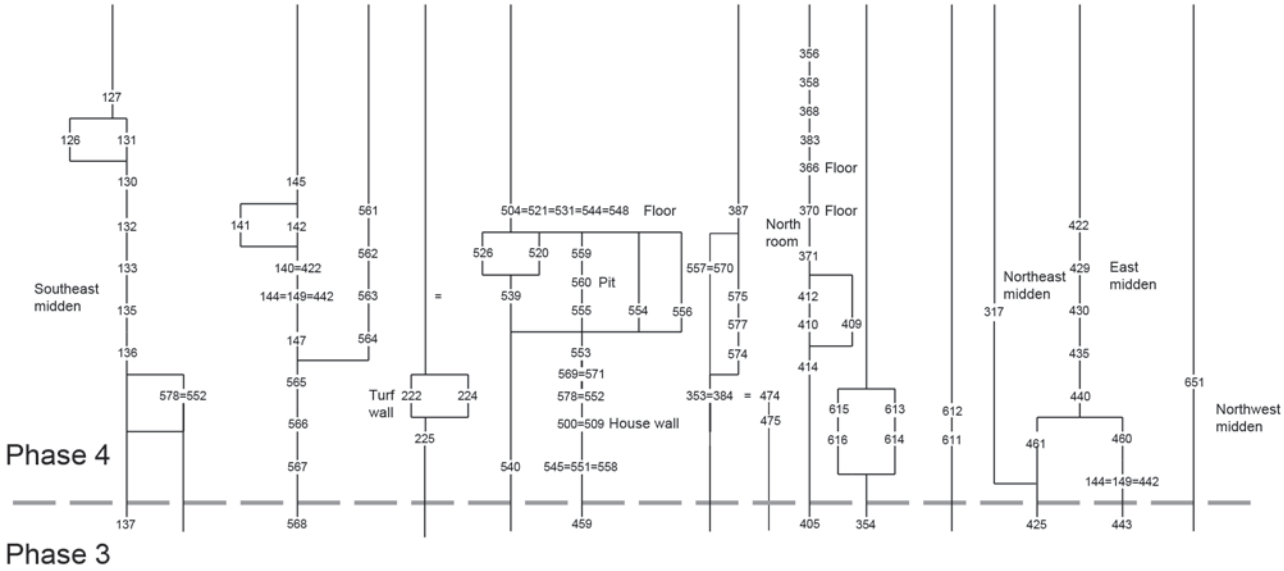


Figure 6.28. Stratigraphic matrix of contexts in phase 4

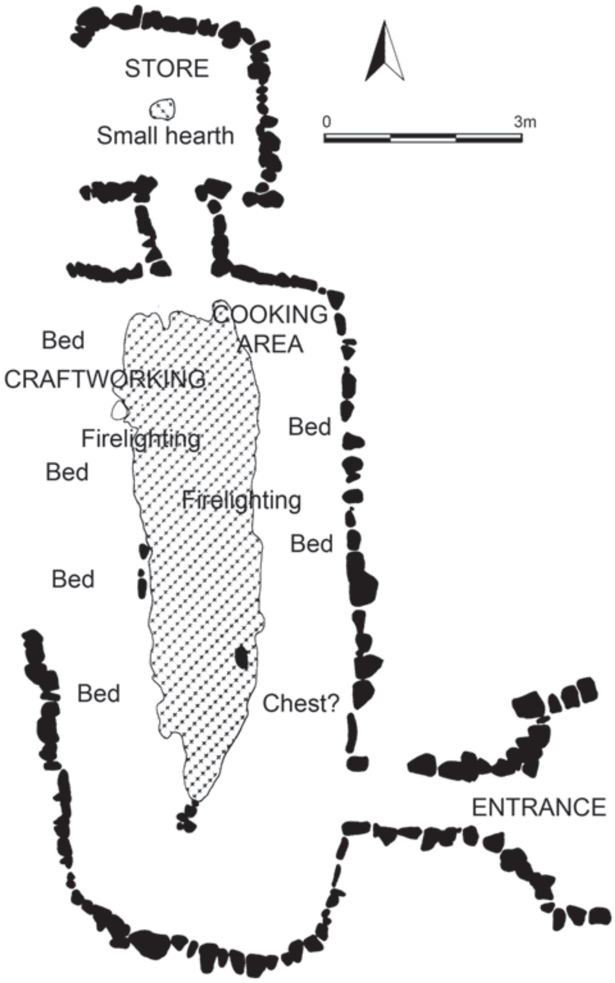


Figure 6.29. Inferred activity areas within House 500

Despite these slight differences in digestion results, the general characteristics of this assemblage most closely match an assemblage produced by an owl, rather than by a mammalian carnivore such as a dog. As suggested in Chapter 18.2, most of the bones from House 500 were probably deposited by an owl, probably a tawny owl nesting on the floor of the house. Slightly higher digestion rates than seen in previously recorded data for owls (Andrews 1990) may result from the fact that nest sites exhibit higher digestion rates than roost sites (Williams 2001), mixing with coprolite-derived bones and teeth, and the results may be skewed by differential recovery of elements during sorting of heavy residues.

Conclusions

The small mammal bones recovered from House 500 were deposited by a mix of predators, with most bones deposited by an owl, probably a tawny owl, and the rest associated with coprolites from dogs and cats. It is likely that the house – if not the entire settlement – was abandoned when the small mammal bones were deposited, as an owl would not have nested while the house was occupied. It seems likely that the unoccupied building would have been inaccessible to other animals, particularly cats and dogs, otherwise a nesting bird would have been disturbed. The deposition of bones by different predators is probably not immediately contemporary, and the coprolite-derived material may indeed be residual, and has perhaps moved around the settlement on the bottom of animal and human feet, or during periods of construction.

If House 500 was used by a nesting owl, one might expect the bones to be concentrated in a core area of the

nest, with further areas of pellet deposition occurring as the chicks began to explore their immediate environment. At the north end of House 500 small mammals are distributed fairly evenly across the floor surface (see Figure 18.17). At the south end there are areas where no bones were recovered, perhaps indicating where the floor inside the entrance was cleaned, presumably at a time when the house was re-occupied. This may suggest that a more centrally located deposit of nest material has either been swept to the edges of the house, or that most material was removed when the house has been re-occupied.

6.8 Overview

M. Parker Pearson

This longhouse was constructed in *cal AD 1060–1110* (*95% probability*). House 500 is the largest of the houses within the sequence at Cille Pheadair, with its long main room leading to a small square room at its north end. As in the previous build (House 700), the hearth occupied the central spine of the long room, but there was now a second, more informal fireplace in the centre of the square north room. The depth and sequence of deposits in phase 4 (Figure 6.28) attest to an intensity and length of occupation greater than in phase 3.

The middens from this phase indicate sustained consumption of mutton, beef, pork and venison as well as cod, pollack and herring. Cooking methods were changing – platter sherds now constituted a third of the ceramics whilst soapstone bowls were going out of use.

The floor layers within House 500 were deep and packed with artefacts and other materials that appear to have either lain where they were dropped or remained where they had been swept towards the door in the southeast corner of the house. Certain artefacts may have been deposited as foundation offerings and as closing deposits on abandonment.

The many different categories of finds present a remarkable picture of activities within the house, notably with evidence for cooking at the north and northeast end of the hearth and craft-working in the northwest (Figure 6.29). The distribution of broken combs and pins along either side of the northern half of the long hearth are also suggestive of dressing and grooming activities in this area, presumably in long-vanished wooden box-beds that would have lined the long walls. The presence of wooden furniture is suggested on the east side of the house by the right-angled edge of a laid floor surface.

We have to consider whether animals were stalled seasonally or occasionally within the longhouse. The south end of the house appears not to have had furniture and did not produce large quantities of artefacts. Instead, this south end contained raw, tempered potting clay but few other materials. But there is no firm evidence to suggest that this rather ‘empty’ area was a byre. The soil micromorphological evidence is ambiguous and the phosphorus analysis (Figure 6.17) suggests that it was not.

Among the many items left on the floor were sherds of a pitcher imported from the Minety area of Somerset. This early twelfth-century pot was probably traded via Bristol and/or Dublin. Its chronological context at Cille Pheadair puts it right at the beginning of the twelfth century, if not in the last years of the eleventh. It is one of a number of items – rising in number from this phase onwards – that derive in substance or in style from the Irish Sea province to the south, in contrast to the northern origins of the Norwegian hones and Shetland soapstone (see Chapter 16) mainly found in the farmstead’s earlier phases of occupation.

Despite evidence for the sweeping of refuse towards the doorway, the inhabitants left a deep layer of filth – for us, though, an archaeologically rich sequence of floor layers. The surprising quantity of dog faeces in the house seems unlikely to have accumulated while people were living in the building yet it is difficult to avoid any other conclusion. The house does appear to have stood empty at some time because the small mammal bones retrieved from the interior of the house probably represent the prey remains of a nesting or roosting owl. Whether the house was abandoned because of a catastrophic event is not known but the presence of horse bones on the floor suggests that loss of livestock might have accompanied the desertion.

Notes

1 It was not feasible to extend the excavation trench to the east; the depth of the overlying deposits would have entailed the removal by machine of a considerable area of what was, at that time, stable sandcliff and machair.

2 In spite of our best efforts to protect the site, coastal erosion, in particular the storms of 2003 and 2005, has now destroyed all trace of House 500 and of all other structures described in this report.

3 A glassy vesicular residue produced from heating silica at high temperatures, but not related to metallurgy.

7 Modification of House 500 (phase 5), rebuilt *cal AD 1070–1125*

M. Parker Pearson and M. Brennand
with contributions by H. Smith, H. Manley, P. Marshall, J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

7.1 The house and its deposits

M. Parker Pearson and M. Brennand

Phase 5 is not a brand-new construction episode but a modification of House 500, which turned the main room of the house into a stand-alone longhouse by shortening its length with a cross-wall (Figure 7.1). This Stage II alteration blocked off interior access to the passageway to the north room. The north room, now cut off from the modified longhouse, remained in use as an outhouse. At the same time, the east wall of House 500 was moved a metre westwards and a new doorway was inserted north of the existing Stage I door.

The east–west cross-wall was an extensive right-angled, double-skinned wall (revetted by stone walls 514 and 525; Figures 3.2, 7.2–7.3) up to 1.60m thick. It and the relocated east wall reduced the internal dimensions of the house to 7.30m north–south and 3.60m east–west. At 26 square metres, it was now just half the size of House 500's Stage I main room in the previous phase. The wall 514/525 provides certain evidence of the form and width of the walls of the houses when free-standing and demonstrates that the house walls were between 1.00m and 1.60m thick.

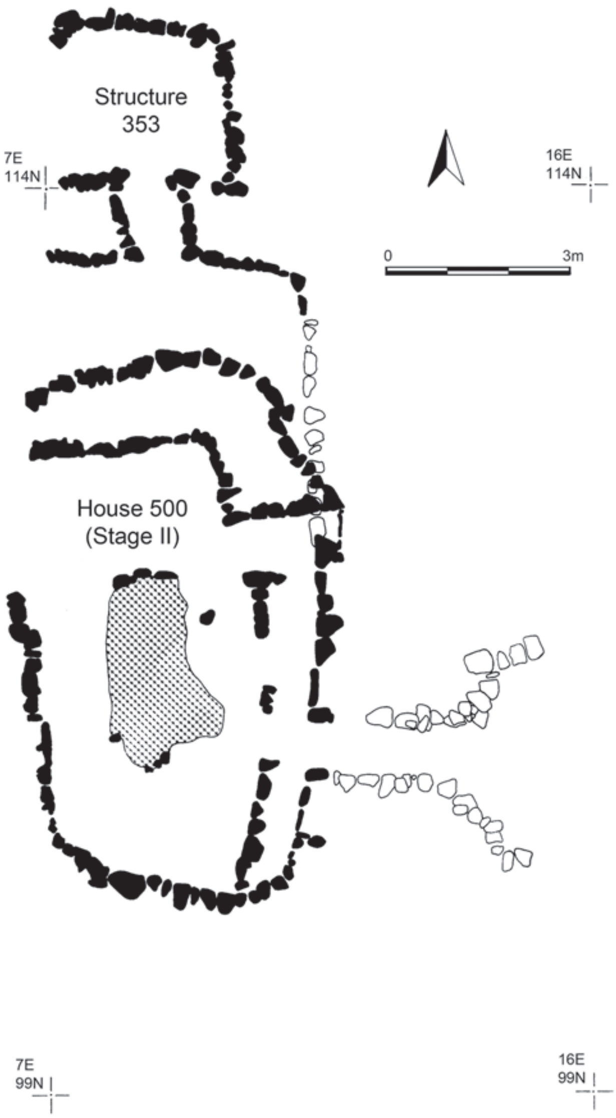


Figure 7.1. Simplified plan of House 500 in phase 5

Construction deposits

The cross-wall was composed of an interior stone wall face (514) and an exterior one (525) with the wall core filled with sand (Figures 3.2, 6.4, 7.2). The base of the wall core packing was a light brown sand (547) overlain by a dog-legged or L-shaped arrangement of stones (546), possibly the residue of the stone pile used to build the wall faces. Layer 547 contained no pottery but produced a near-complete fine-toothed comb with preserved nit eggs attached to the teeth, a pair of complete or near-complete iron tools (a tanged chisel and a knife as well as other iron

Table 7.1. Phase 5 non-ceramic artefacts by context from house construction, floors and abandonment

Context type	Context number	SF number	Artefact	Figure no.
PHASE 5				
Construction deposits	547	1926	fragments of a single-sided composite comb	13.4
		1904	flint scraper	16.5
		see Chap 15	iron knife, chisel, rove, fitting, nails, strip	
	533	1910	comb tooth-plate	13.4
		2181	bone needle fragment	14.1
		see Chap 15	teeth of iron wool comb or heckle, needle, fittings, nails, strips, plate fragments	
	530	2202	worked bone	
		1984	perforated cetacean vertebra (pot-lid)	14.9
Floors of House 500	503 hearth	2790	bone pin fragment	
		2717	bone point	
		2792	worked shell	
		see Chap 15	iron clench nail, roves, nails	
	522	1832	nail-headed decorated bone pin	13.12
		1692	perforated cetacean bone plaque	14.7
	535	1786	reel-headed decorated bone pin	13.12
Deposits later than the floors	505	see Chap 15	iron nail	
	506	see Chap 15	iron clench nail	
Abandonment	395	see Chap 15	iron nail	
	532	see Chap 15	unident iron fragment	
	517	1686	silver finger-ring	13.15, 13.18
	507	1661	fragment of a single-sided composite comb	13.4
		1649	reel-headed decorated bone pin	13.12
		1675	transversely flattened-head bone pin	13.12
		2701	bone point, tip broken	14.2
		2740	bone point	
		2742	worked bone	14.3
		1679	drilled cetacean vertebra	
		see Chap 15	iron knife, rove, nails	
	512	2769	bone pin fragment	

items, a prehistoric flint scraper, and a quantity of green slate and grey slate (for SF numbers, see Table 7.1).

The stone heap (546) was subsequently buried under a deposit of brown sand (wall core 533; Figures 3.2, 6.4, 7.6). Carbonized residue from a near-complete pot within layer 533 produced a radiocarbon date of cal AD 1020–1210 at 95% probability (SUERC-4882; 930±40 BP). These wall core deposits were constructed directly onto floor 548 of phase 4; thus part of 504=521=531=544=548 was covered by the new east–west wall.

Another stone wall face (513) was inserted along the east side of the house, making its width narrower (Figure 7.2). It forms, with the existing internal east wall of House 500, a double-skinned wall 1.00m to 1.40m thick, filled with a grey sand (530; Figure 7.6) which was placed directly onto the phase 4 house floor. This sand contained a pierced whale bone disc, a piece of worked bone and a large quantity of green slate fragments (Table 7.1).

A new, second entrance was constructed in the centre of the east wall, with three upright stones (401) revetting the material outside the house and acting as a threshold (Figure 7.2). For the first time at Cille Pheadair, access into the house required stepping down from the outside into the interior rather than the floor sloping up to the doorway. A break in wall 513 opposite the original entrance at the southern end of the east wall suggests this original doorway

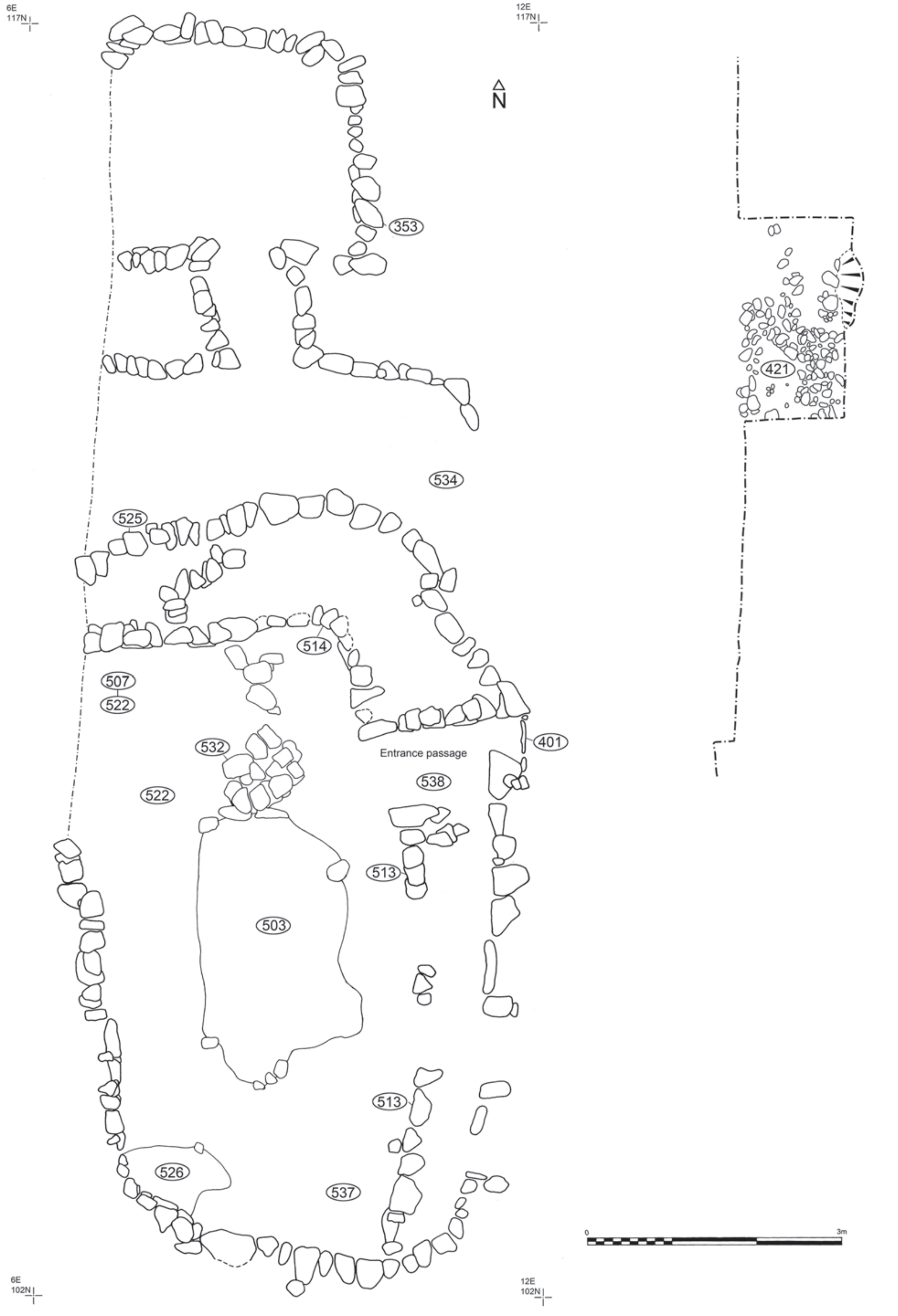


Figure 7.2. Plan of House 500 Stage II with stack-base 421

Figure 7.3. House 500 Stage II, showing the floor and central hearth (503) being excavated in quadrants, viewed from the east

might have also remained in use for some time after the building was reduced in size.

From the new, northern entrance with its threshold stones, access to the now-freestanding north house, was along an exterior path (534) whose western edge was house wall 525 and whose eastern limit was a partially surviving line of stones (unnumbered) on the south and west edge of windblown sand (325).

The house floor

A multi-lensed deposit of black to orange peat ash (503) within the centre of the newly reduced dwelling was a 3.20m-long remnant floor layer that contained a hearth at its southeastern end. Layer 503 sat on floor 504 of phase 4 and is contemporary with the reduced-size, modified House 500 in its Stage II (Figures 6.4, 7.2–7.3). This hearth layer (503) was associated with a number of ephemeral, dark brown organic sand deposits (522, 527, 537, 538 and 535) that formed the house's phase 5 floors. Two carbonized seeds from this hearth layer (503) produced radiocarbon dates of cal AD 990–1160 at 95% probability (SUERC-5079; 980±35 BP) and cal AD 980–1160 at 95% probability (SUERC-4899; 990±35 BP). Artefacts from the hearth layer are described in section 7.4 below.

These floor layers were stratigraphically equivalent to hearth layer 503, with their uppermost lenses also overlying the hearth deposit, a similar stratigraphic relationship as was seen in the preceding phase between floor deposits 504=521=531=544=548 and hearth 555. These phase 5 floor deposits were found to be very patchy, having been badly damaged and partly removed by activity in phase 6 and building work in phase 7. Consequently they were not selected for intensive environmental sampling using the project's 1m-square grid system.

Within the new, northern entrance to the house, floor 538 (covering floor 504 [phase 4]), was a compact, orange organic sand with charcoal inclusions. To the west of 538, a patchy, dark brown organic sand (522), probably equivalent to 537 (a brown sand within the southeast corner of the house; Figures 7.2–7.4), contained a finely executed nail-headed bone pin. Layer 527 was a thin black lens within layer 522. Floor 535 was a localized patch of dark brown material spread over the top of a sub-oval pit (523; Figure 7.4), which also produced a complete bone pin and a deciduous tooth from a dead child (see Chapter 20).

Pits and other deposits later than the floors

Subsequent activities within the building were apparent as a series of pits, postholes, and stonework (Figures 7.4–7.5), together with a build-up of windblown sand.

- Pit 523, 0.23m deep, cut through wall 513 into the eastern wall core (530) and was filled by a series of loose grey and brown sands (542 and 543, both under 541 which was itself under 524) and covered by a yellow sand (536).
- A steep-sided, sub-rounded pit (501), 0.33m deep, was dug through the southern end of hearth layer 503. Although filled with a loose dark grey-brown sand (502), it contained none of the distinctive truncated hearth material.
- In the south of the house, overlying floor 504 (phase 4), there was a patch of very clean, white sand (506) capped by a spread of grey peaty sand (505).
- To the east, the earlier floor (504) was truncated by another pit (518), 0.1m deep, lined with a clean white sand (519) and again capped by a grey peaty sand (515).

None of the pits within the house appear to have been backfilled immediately with the material removed as they were dug out. There were relatively few finds within the pit fills, and no indication of any clay lining, which might be expected had these pits been storage tanks or seafood larders (although they could have been lined with now-vanished organic materials such as leather).

Abandonment

The floor deposits were subsequently overlain by layers of windblown sand, suggesting that the building fell into a state of disrepair, perhaps into a semi-roofed state. In the southern part of the house, hearth layer 503 and layer 505

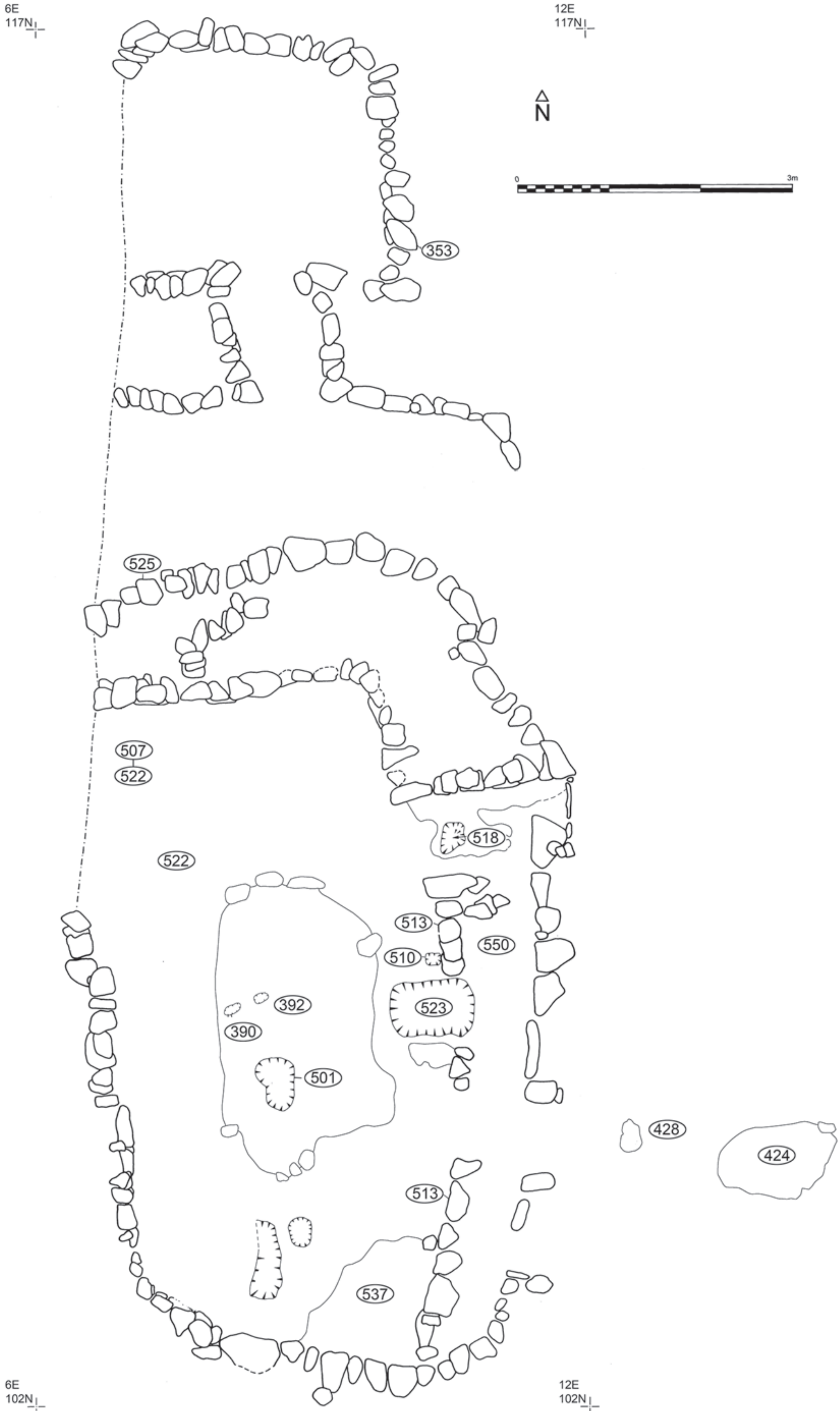


Figure 7.4. Plan of cut features within House 500 Stage II

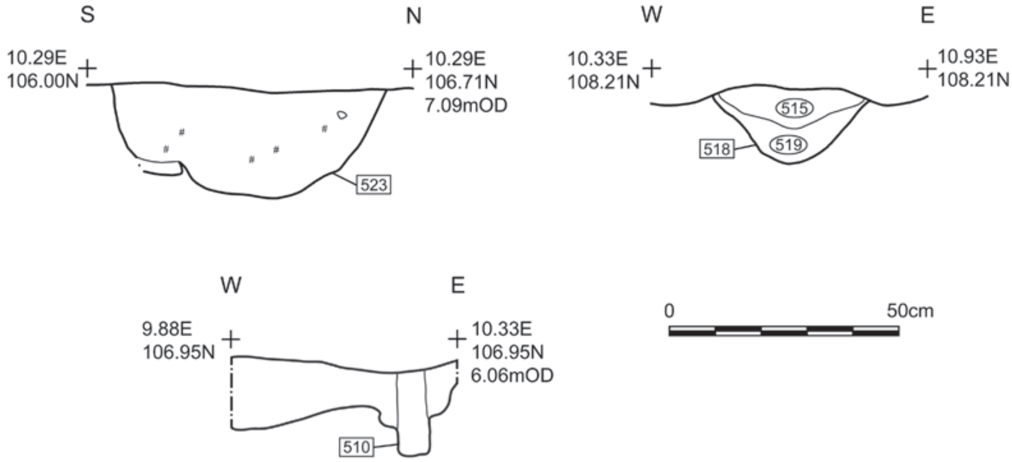


Figure 7.5. Sections of cut features within House 500 Stage II

were overlain by a thin spread of fine white windblown sand (395, visible in Figures 3.2 and 6.2). Layer 395 was mostly destroyed by the west end of House 312 (phase 7; see Chapter 9). Into 395 were inserted two postholes (390 and 392) whose dark grey (391) and grey-brown fill (393) were devoid of bones or artefacts.

The floor layers 522 and 538 were covered by a clean grey and white sand (418) cut by a single posthole (510) with a square-profiled postpipe (511). The sand layer 418 and the northern stones of layer 503 containing the hearth were overlain by a rectangular block of unworked beach cobbles (532), surviving up to two courses in height and in alignment with the northern corner of the northernmost entrance of the house (Figure 7.6). Layer 418 was also overlain by an isolated deposit of dark brown organic sand (512), subsequently covered by a section of laid stone paving (417). Within another of these infill layers (517) was a silver finger-ring (Table 7.1).

Against the northern wall, over floor 522, a thin layer of brown windblown sand (516) accumulated, being subsequently overlain by a friable light grey sand (507; Figure 6.4), containing a number of bone and iron artefacts, including a finely executed bone pin (Table 7.1).

The three postholes and the areas of cobbles (532 and 417), which might have formed a parallel pair of post bases, may be components of a final construction after the floors had gone out of use. The windblown sands 395, 516 and 418 presumably mark a period when the roof was off. The postholes are cut through this layer and may be the remains of supports for a new roof. However, if this was an episode of re-roofing, there was no occupation surface in association with it, and this was presumably a short-lived measure after which the house was never again inhabited.

The infilling of the northern end of the house by a layer of dark brown sand (394; Figure 6.4) which covered its walls marks the beginning of phase 6. The east–west wall 514=525 was in a state of disrepair by this time and we can be confident that House 500 was now abandoned.

7.2 The outhouse (Structure 353) and the stack-base (421)

M. Parker Pearson and M. Brennand

The modification of House 500 in phase 5 converted the north room into a square outhouse. This pairing of a major building with an outhouse is a common feature of Late Norse settlements in the Northern Isles as well as the west of Scotland and is known at key sites such as the Brough of Birsay (Graham-Campbell and Batey 1998: 190). This arrangement of longhouse and square outhouse was to continue at Cille Pheadair in phases 7 and 8, and was indeed a feature of blackhouse life into the first half of the 20th century (Curwen 1938; Kissling 1944).

The pathway to the outhouse

Access from House 500 into Structure 353 – the former north room now turned into an outhouse – was achieved by stepping up from the house's interior onto the new threshold (401) and turning smartly left to follow the northeast corner (wall 525) of the house. The route then led over a length of the demolished stone and turf wall of House 500's earlier phase to the south-facing door of the outhouse. A dark grey to black organic sand (534) accumulated to the east and north of the house, covering the lowest, robbed-out, courses of the original north wall (500) of the house. This organic sand was laid down after the threshold stones (401) and it is best interpreted as a pathway linking the doorways of the house and the outhouse. An arrangement of stones (325) east of 534 might have formed its eastern edge. An unusual find in 534 was a bone pin-head decorated with a Ringerike-style incised motif (Table 7.2).

The pathway (534) was succeeded by a sequence of brown sand layers (416, 447 and 397), of which 447 and 397 were interspersed with thin layers of white windblown sand (448 and 389). The former are probably re-established

Figure 7.6. House 500 Stage II with rubble infill after abandonment

Table 7.2. Phase 5 non-ceramic artefacts by context from the path to the north room

Context type	Context number	SF number	Artefact	Figure no.
PHASE 5				
STRUCTURE 353: PATH TO THE NORTH ROOM				
path and layers above path	534	1781	Ringerike-style decorated bone pin-head	13.12
		2787	bone toggle	
		1902	iron lump	
		1887	bone point fragment	
		see Chap 15	iron clench nails, rove, fitting, nails, unident fragment	
	416	see Chap 15	iron clench nail, nail	
	397	2738	antler sleeve or cylinder, same artefact as SF2726 (Table 7.3)	
		1824	worked cetacean bone	
		see Chap 15	iron knife, fitting, nails, bar	
	389	1602	comb fragment	
		see Chap 15	iron rove	
	386	2725	bone point fragment	
		see Chap 15	socketed iron gouge or chisel, tooth of comb or heckle, tool socket, tang or arrowhead, clench nails, roves, nails, unident fragment	
	441	see Chap 15	iron rove	

path surfaces that were trampled on top of thin layers of wind-deposited sand which had temporarily covered the footpath. The final brown sand layer (397) was laid down before a deep layer of grey-brown sand (386) filled the entrance passage of the outhouse, and before a deposit of off-white sand (441) accumulated against the northeast corner (wall 525) of House 500.

A shelly sand (385) was then tipped on top of 386 and the whole of this northern area beyond wall 525. Layer 385 is one of a number of stratigraphically equivalent thick layers of off-white windblown sand (351=313=325=023=385) which completely covered the wall tops of the outhouse (Structure 353). A large number of artefacts came from these windblown sand layers covering the outhouse (Table 7.3).

The use of the outhouse

As discussed in Chapter 6, the identification of a floor layer within the outhouse in this phase is problematic. In spite of the absence of satisfactory stratigraphic links between the outhouse, its passageway and the outside, the conjoining sherds recovered from different contexts do indicate that the floor of House 500's first stage (531=504) was contemporary with the passageway floor (387) and with the sand layer 356 within the north room, with all of these layers forming towards the end of phase 4 and before the structural alterations of House 500's Stage II in phase 5. Consequently, the earliest layer within Structure 353 that may be equated with its re-use as an outhouse in phase 5 is 352, a layer of light grey sand which formed across the southern and southeastern part of the interior only, fanning out from the doorway (Figure 6.4).

Thereafter, the whole outhouse and surrounding area was buried beneath a deep layer of windblown sand (351=313=325; the numerous artefacts from 351 and 313 are discussed in section 7.5 below). Thus 352, with its charcoal flecks and small clay lumps, is probably the only floor surface deposit associated with use of Structure 353 as an outhouse in phase 5.

The stack-base (421)

There are three features in phases 5–7 which survived as localized cobble spreads. On the eastern extremity of the site, set into layer 308 in the eastern midden area, an area of burnt beach cobbles (421) formed a surface 0.50m north–south and 1.90m east–west (Figure 7.2). It is interpreted as an area of hard-standing, perhaps a stack-base for storing hay or straw. It belongs to phase 5 and appears to be earlier than a similar stone arrangement (350) associated with phase 6 and another (372) placed in phase 7.

Similar structures have been recorded within a yard in the nineteenth-century settlement at Airigh Mhuillin (Symonds 2000) and others are still used today to stack freshly mown straw and hay.

Table 7.3. Phase 5 non-ceramic artefacts by context from layers covering the outhouse

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 5				
STRUCTURE 353: ABANDONMENT				
Abandonment	385	1540	perforated antler peg	
	351	1503	comb case	13.4, 13.9
		1752	comb tooth-plate	
		1875	comb tooth-plate	
		2737	fragment of a single-sided composite comb	13.4
		1882	fragment of a single-sided composite comb	13.4
		1410	bone pin fragment	
		1522	bone pin fragment	
		2741	perforated pig fibula pin fragment	
		1523	bone toggle	
		1890	bone needle	
		2743	bone needle fragment	
		1410	bone point or pin fragment	
		1884	bone point fragment	
		2744	bone point	
		2745	bone point	
		2747	bone point	
		1417	broken hone	
		1544	polished stone	16.2
		1420	polished stone possible gaming counter	16.2
		see Chap 15	iron needle, two tangs, clench nails, roves, fittings, nails, unident fragments	
	313	1775	comb tooth-plate	
		1678	worked antler beam	
		1873	comb tooth-plate	
		1707	nail-headed bone pin fragment	13.12
		1774	bone pin	
		2726	antler sleeve or cylinder, same artefact as SF2738 (Table 7.2)	14.4
		2695	cetacean bone dish fragment	14.6
		see Chap 15	fragment of iron wool comb, two needles, clench nails, roves, fittings, nails, strips, plate fragment	
	325	2707	complete bone point	14.2
	023	1278	fragment of a single-sided composite comb	
		1016	decorated bone mount, probably same artefact as SF1208 (Table 9.2)	13.14
		1294	worked bone	
		1595	polished stone	
		1596	polished stone	
		see Chap 15	tooth of iron wool comb or heckle, nails	

Table 7.4. Phase 5 non-ceramic artefacts by context from the forecourt and southeastern midden

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 5				
FORECOURT AND SOUTHEASTERN MIDDEN				
	128	1023	iron pin	13.16
	420	2735	fragment of a single-sided composite comb	13.4
		see Chap 15	iron nail	
	125	see Chap 15	iron nail	
	219	1560	bone pin fragment	13.12
		2575	spherical iron object	13.16
		1600	worked bird bone	
		1533	polished stone	
		1831	worked cetacean bone	
		see Chap 15	iron tool socket, clench nail, rove nails, plate fragment, unident lump	
	118	2530	grinding stone	
		see Chap 15	iron fitting, nails, plate fragment	
	117	2531	polished stone	
		see Chap 15	iron nail	
	114	1880	complete bone point	
		1543	grinding stone	16.2
		1547	hone or stropping stone	
		see Chap 15	iron clench nail, nail	

7.3 The middens

M. Parker Pearson and M. Brennand

The southeastern midden

Layer 128, in the forecourt of House 500, is taken as the marker for the beginning of the phase 5 deposits in the southeastern midden area, because the numerous dog coprolites within this layer indicate that the original southern doorway of House 500 was strewn with faeces and might therefore now have been used only as an access or pen for dogs, if indeed it had not fallen entirely out of use.

In the forecourt, layer 128 had a small north–south stretch of wall (119), standing to two courses, set into it and possibly serving as a short retaining wall to keep midden material out of the filled-in hollow of the forecourt area (see Figure 5.11 for the section drawing of phase 5 midden layers). This layer of windblown sand (128) could be followed into the midden as layer 420 and it defines the beginning of midden accumulation within phase 5.

Layer 128 was covered by a compacted, dark brown organic sand, interpreted as a thin deposit of hearth ash (125). Layer 125 lay below a friable, brown sand layer (124), below a dark grey, organic sand containing heat-cracked beach cobbles (123; Figure 5.11). These deposits were covered by an extensive but thin layer of white windblown sand (122) that lay beneath a light grey friable sand (121=129) with inclusions of shell and bone. Layer 121 filled the area above House 500's forecourt area (it equates to 219=129=426; Figure 5.11).

Layer 121 was covered by a layer of white windblown sand (120) through which two small pits, filled with grey sand (423 filled with 424 and 427 filled with 428; Figure 7.4), were dug into the abandoned passageway of House 500's southern doorway. Covering layer 120 were four consecutive layers, 118 (shelly), 117 (dark brown with burnt material), 114 (shelly) and 104 (organic grey with shells and charcoal). To the southwest, layer 219 was covered by a dark brown sand layer (220). Artefacts from the southeastern midden and forecourt area are listed in Table 7.4.

The northeastern and eastern middens

The earliest layer ascribed to phase 5 in the northeastern midden was a thin black layer (318) that separated 317 (phase 4) from 315, a soft, dark grey-brown sand (see Figure 5.11 for the phase 5 midden layers). Layer 315 contained a number of bone and iron artefacts, including a comb fragment, pins, needles, an iron knife and cauldron fragments. Artefacts from the northeastern and eastern midden layers are listed in Table 7.5.

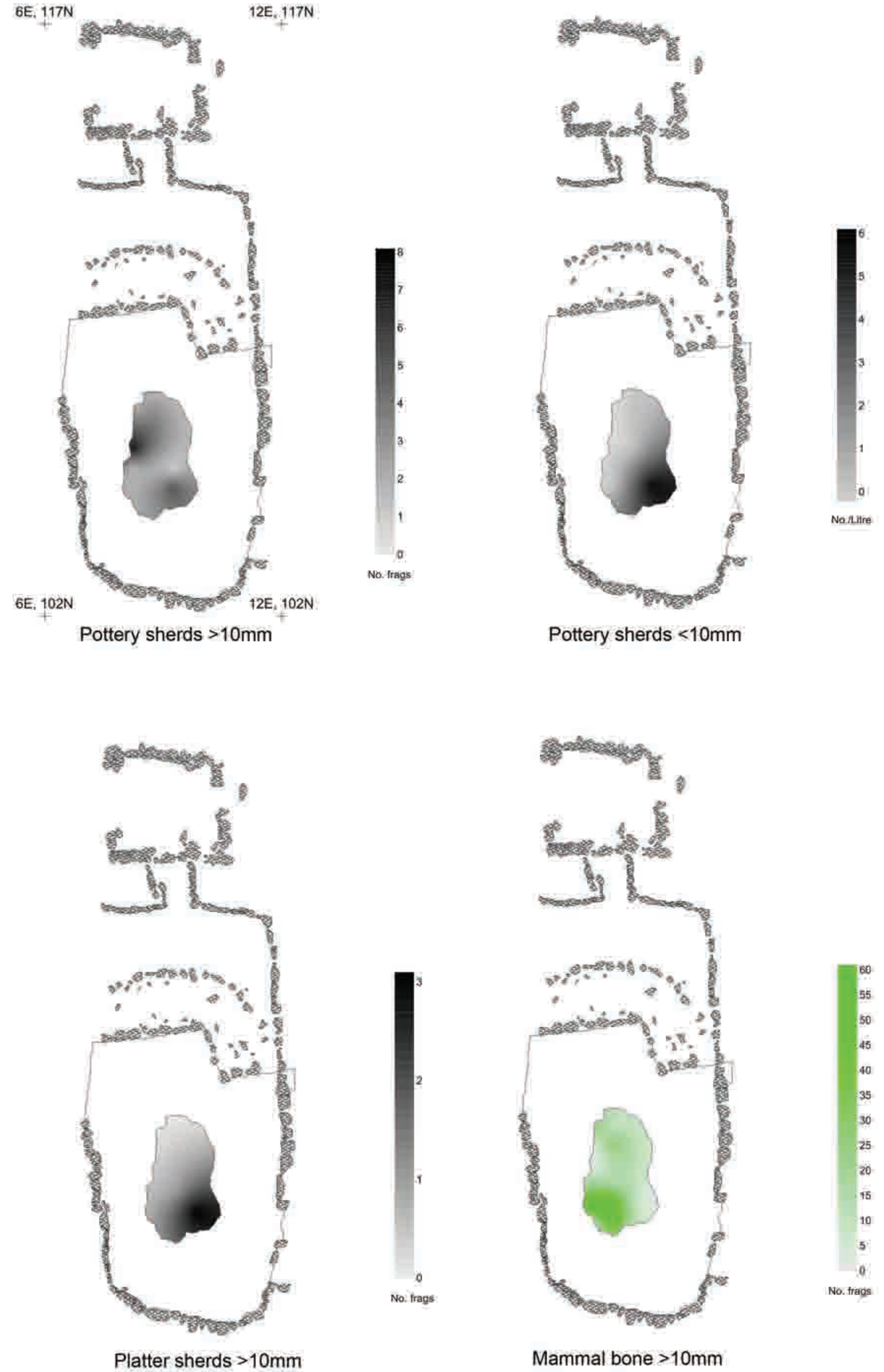


Figure 7.7. The distribution of pottery, mammal bone and fish bone in hearth layer 503 of House 500 Stage II (continued overleaf)

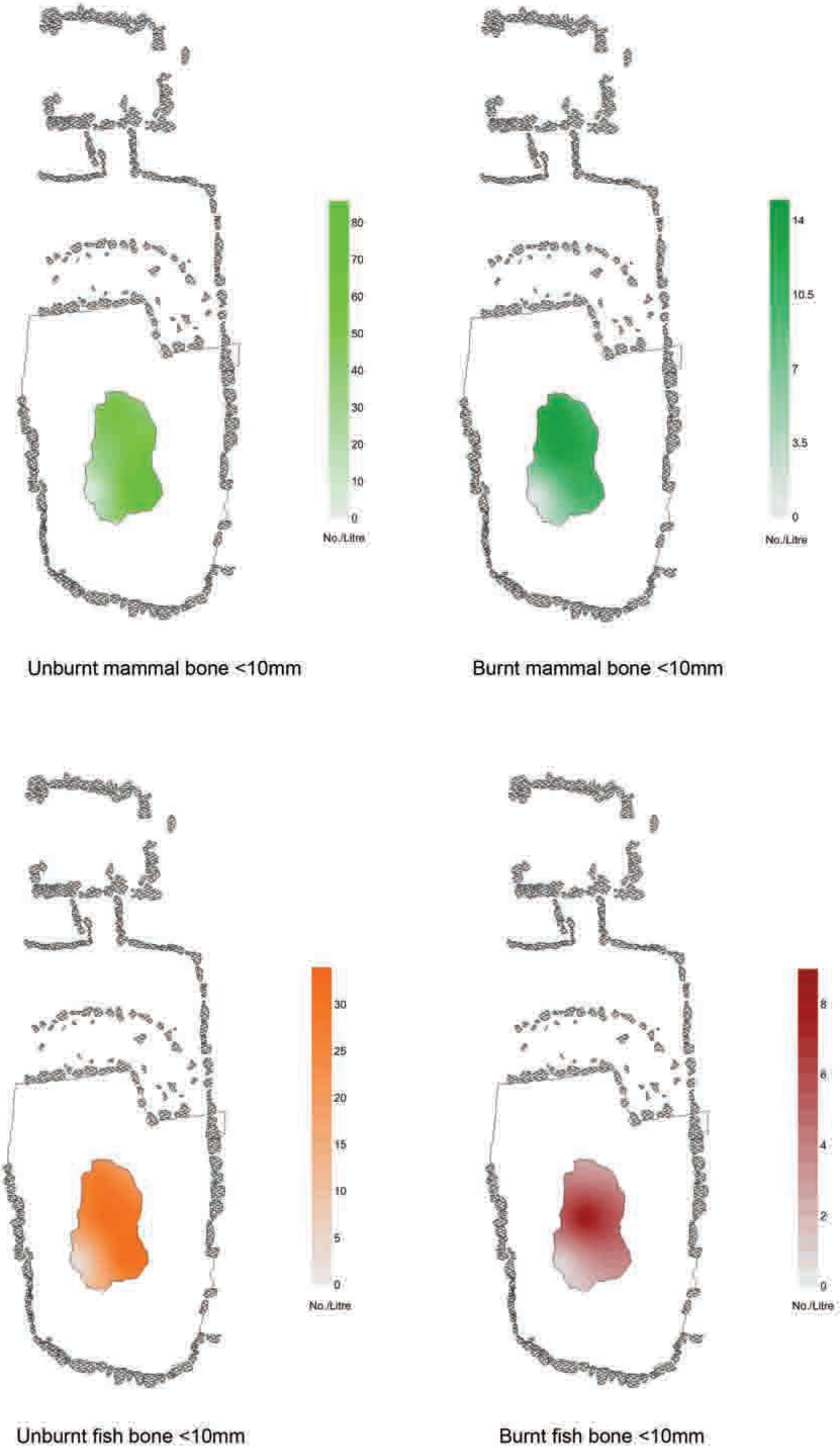


Figure 7.7. (continued from previous page)

Table 7.5. Phase 5 non-ceramic artefacts by context from the northeastern and eastern middens

Context no.	SF number	Artefact	Figure no.
PHASE 5			
NORTHEASTERN AND EASTERN MIDDENS			
315	1876	fragment of a single-sided composite comb	13.4
	1881	bone pin fragment	
	2727	bone pin fragment	13.12
	1688	bone toggle	
	2721	bone needle fragment	
	2722	bone point, tip broken	
	2749	bone point	
	see Chap 15	iron knife, tang, cauldron fragments, clench nail, roves, nails, strip, plate fragments, unident fragments	
314	1107	antler arrowhead	14.2
308	1654	fragment of a single-sided composite comb	13.4
	1632	dome-headed decorated bone pin	13.12
	2130	transversely flattened-head bone pin	13.12
	2728	bone pin fragment	
	2732	bone needle fragment	
	2736	bone needle fragment	
	1295	socketed bone point	
	1270	bone awl	
	1299	bone point	
	2706	bone point, trip broken	
	1075	worked antler tine	14.4
	1653	worked antler tine	
	1630	steatite spindle whorl fragment	
	see Chap 15	iron teeth of wool comb or heckle, needle or pin, two tangs, two suspension hooks, clench nails, roves, fitting, rivet, nails, strips, plate, plate fragments, unident fragments	
306	1054	bone pin-beater	14.2
	see Chap 15	iron roves	
309	see Chap 15	iron fitting	
419	1891	fragment of steatite vessel	
	see Chap 15	iron fitting	
010	1247	comb tooth-plate	
	1269	fragments of single-sided composite comb	13.4
	1277	comb tooth-plate	
	1874	comb tooth-plate	
	2807	fragment of a single-sided composite comb	13.4
	1621 and 1624	fragments of a single-sided composite comb	13.4
	1051	bone pin fragment conjoins SF1302	
	1283	bone pin fragment	
	1302	thistle-headed bone pin, complete, in two parts (conjoins SF1051)	13.12
	2796	bone pin fragment	

Table 7.5. continued

Context no.	SF number	Artefact	Figure no.
PHASE 5			
NORTHEASTERN AND EASTERN MIDDENS			
010 continued	2797	bone pin fragment	
	1052	decorated bone mount	13.14
	1475	frustum-head copper-alloy pin	13.15, 13.20
	1004	iron and copper-alloy weight	13.15
	1620	copper-alloy sheet	13.15
	1577	bone spindle whorl	
	1051	bone or antler point	
	1283	bone point	
	1568	worked horn	
	see Chap 15	iron clench nails, roves, fittings, nails, strip, plate fragments, unident fragment	

Above layer 315 was a compact red-brown sand (314) with clay and charcoal inclusions, containing an unusual antler arrowhead. Layer 314 lay below layer 308, as did 422, identified as the uppermost midden deposit of phase 4.

Layer 308 was an extensive spread of light grey sand that covered the whole of the midden north of the abandoned forecourt. It was extremely rich in artefacts; the small finds assemblage includes a comb fragment, a dome-headed bone pin, a steatite spindle whorl, suspension hooks for a cauldron and fragments of slag.

On the surface of layer 308 were three small and patchy deposits: a grey-black peaty sand (306, containing a bone pin-beater), a thin strip of white sand (307), and a shell layer with grey-black sand (309).

Also sitting on 308 was a cobbled surface (421), perhaps forming a stack base and discussed above. Above it was a layer of off-white sand (420) and above that a grey sand (419). The layers 306, 307, 309 and 419 were all sealed by a dark grey-black organic sand (010) which was visible in the eastern midden area on the surface of the site after machine-stripping and prior to excavation.

Layer 010 contained many artefacts, including comb fragments, a thistle-headed bone pin and a copper-alloy frustrum-headed pin, a bone spindle whorl and an iron and copper-alloy spherical weight, one of only two such Viking Age/Late Norse iron weights to be found in Scotland (Table 7.5).

Layer 010 was cut by both House 007 (phase 8) and House 312 (phase 7), and possibly accumulated in phase 6 rather than in phase 5. Unfortunately there is no means of determining which is the case and it is placed within phase 5 because there is no evidence for activity in phase 6 on this eastern side of the mound.

As with the midden layers in phase 4, there were dog coprolite fragments in many of the phase 5 midden and abandonment layers: 010, 125, 128, 308, 313, 314, 315, 351 and 420. Coprolites were also found in the hearth within the house (see below).

7.4 The spatial patterning of debris within hearth layer 503

M. Parker Pearson, H. Smith, H. Manley and P. Marshall

The poorly preserved house floors of phase 5 rule out any detailed study of spatial patterning. However, analysis of the material recovered from flotation samples taken from hearth layer 503 can be combined with study of small find distributions and floor layer fragmentation patterns to gain an outline understanding of activity patterning and use of space.

Ceramics

The densities of sherds from hearth layer 503 are greater than those from the hearth of House 700 but less than in House 500's Stage I hearth (555). Although numbers are not more than seven per 1m-grid square, there is a spatial division between non-platter sherds >10mm when compared to both small sherds <10mm and to platter ware >10mm (Figure 7.7). The platter sherds and small sherds are concentrated in the southern half of the hearth layer, where the fireplace itself was located. There was no concentration of sherds at the north end of the hearth layer as was observed in preceding phases.

In the areas beyond the hearth layer, only seven sherds (including one platter sherd) came from the whole of layer 522, the floor deposit covering the northern half of the house. There were no sherds at all from any of the other floor layers. Layer 352 within the outhouse was considered to be more of a spread than a floor and was not sampled by grid square.

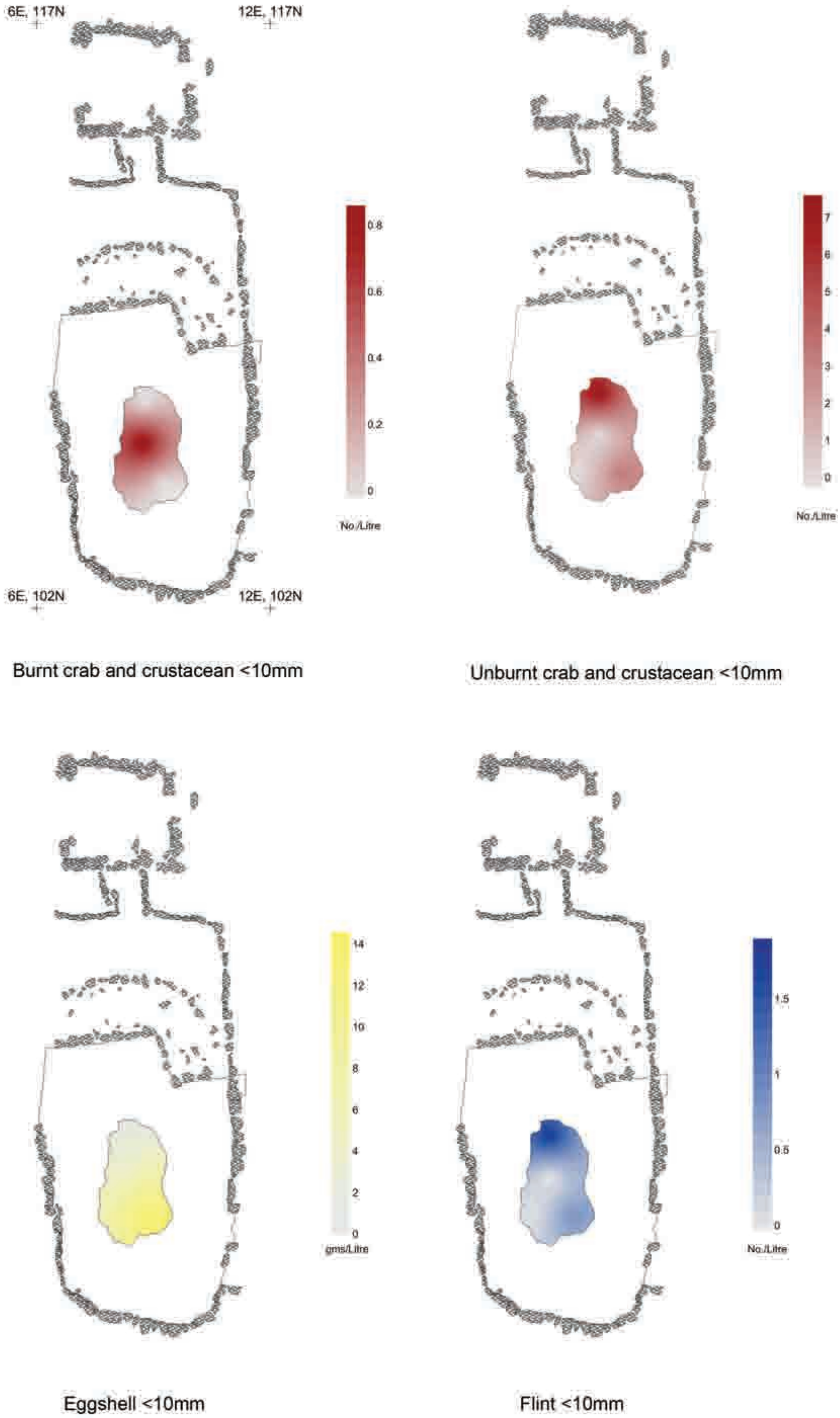


Figure 7.8. The distribution of crab, eggshell, flint, iron and ironworking slag, fuel ash slag, Spirorbis, charcoal and pebbles in hearth layer 503 of House 500 Stage II (continued over the next two pages)

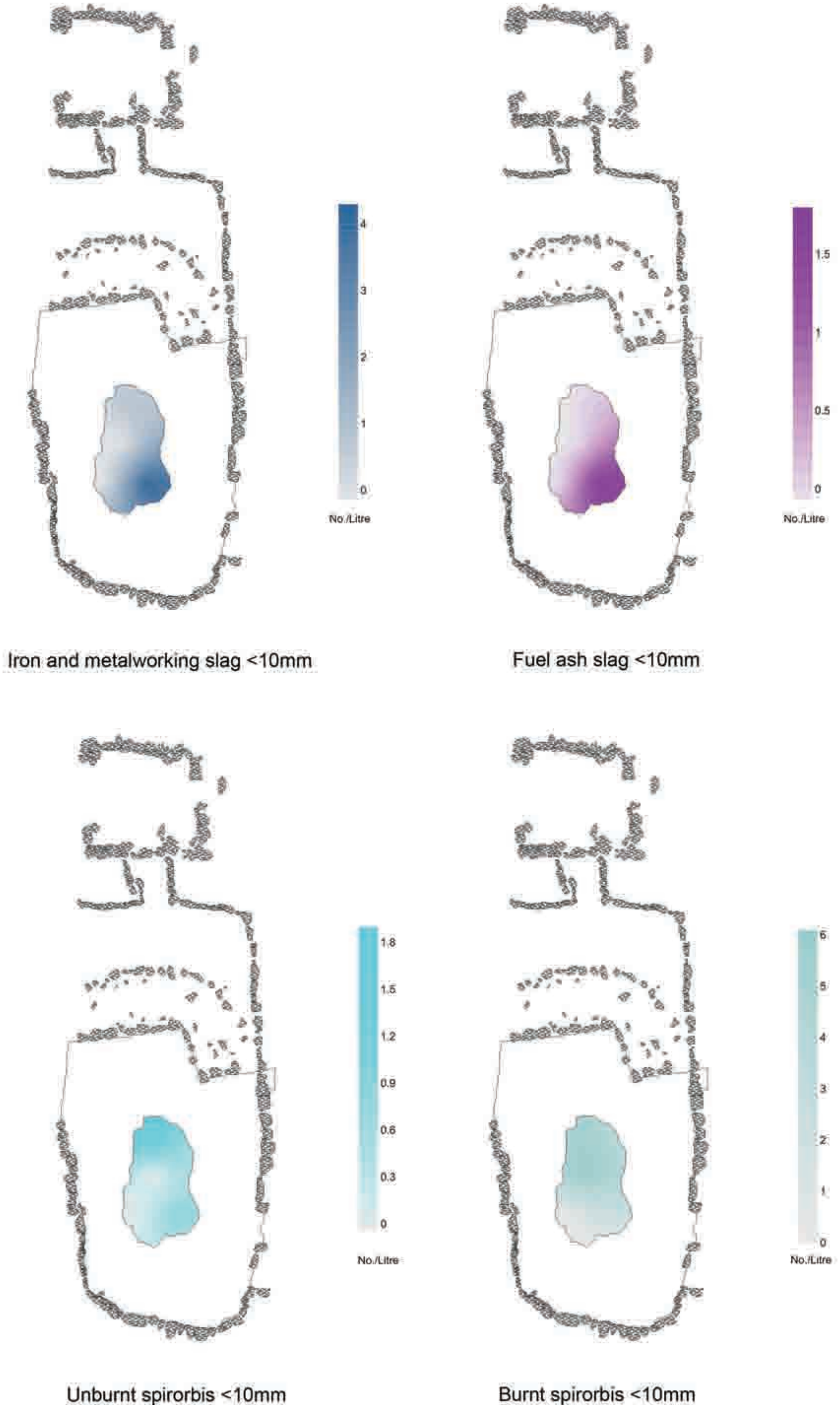


Figure 7.8. (continued from the previous page and on the opposite page)

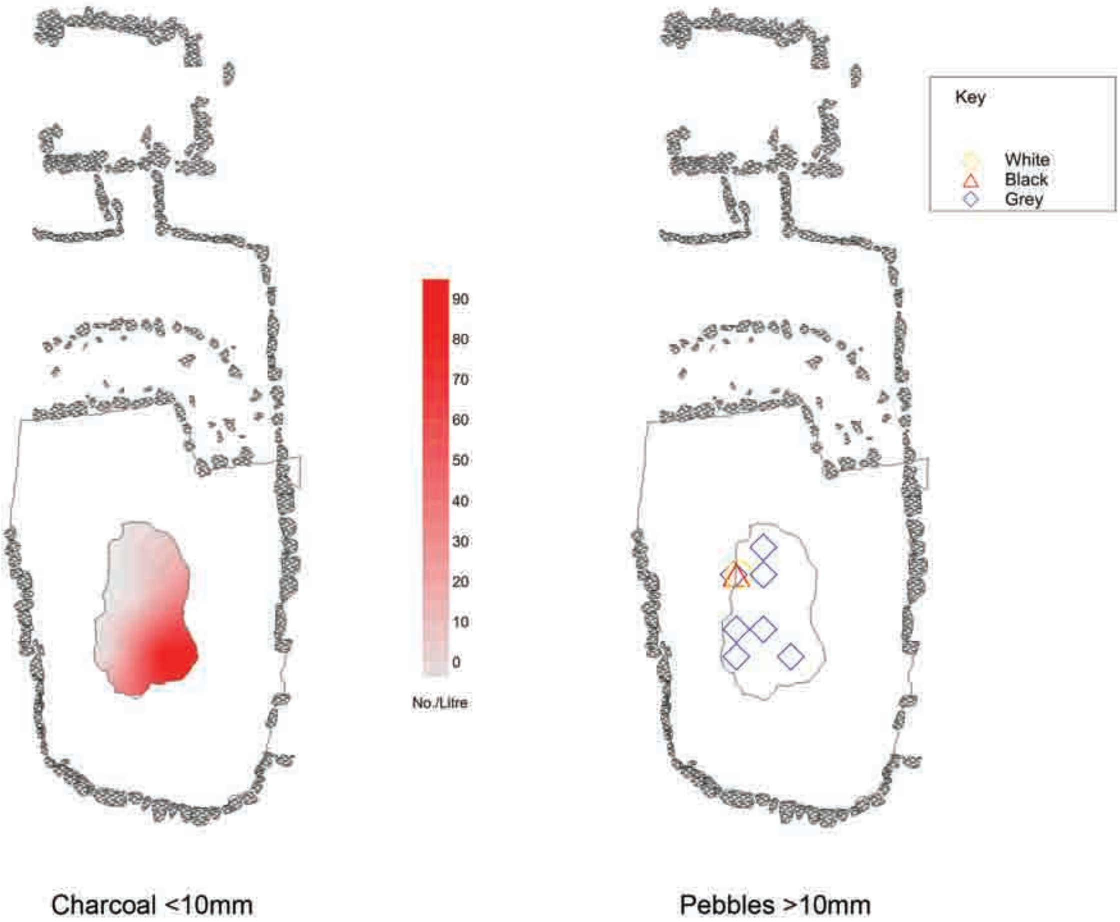


Figure 7.8. (continued from the previous two pages)

This layer produced 30 sherds (seven of them platter ware), almost as many as from the whole of the longhouse.

The low density of material and poor survival of floor layers make interpretation difficult. The low numbers of sherds in the northern half of the longhouse are slightly surprising but hint at the possibility that the house floor was kept clean and well swept (like floor 701 in phase 3), or that occupation on it was short-lived. The exterior pathway (534) produced much larger quantities of sherds and bone debris than any interior floor layer. As can be seen from the plans which show the Stage II east–west wall superimposed over the original Stage I house plan (*e.g.* Figure 7.2), the pathway which curved around the outside of the new Stage II wall ran across phase 4 floor layers. Thus the high quantities of material in pathway 534 may partly result from mixing with the sherd-rich floor layers of phase 4 beneath.

Clay

Five lumps of clay were recovered from the long axis and north end of the hearth layer (Figure 7.9). All were ungritted and of grey colour except one brown piece. In contrast, a lump of gritted grey-green potting clay came from north of the hearth in floor layer 522. Just possibly this spatial distinction separates the use of untempered clays on the hearth (as noted in phases 3 and 4) from a potting area in the north end of the longhouse.

Animal bone fragments

Animal bone fragments were relatively few across the hearth layer (503) and floors 522 and 535. Bones >10mm were most frequent at the southwest end of the hearth (Figure 7.7). Over 30 fragments from another small patch of floor layer (535, covering pit 523) indicates reasonable densities in that eastern part of the house but the similar number from the whole of floor 522 (covering the northern half of the house) shows a lower density across this much larger area. Bone densities were fairly high within layer 352 in the outhouse and even greater along the path (534) that led to it.

Within the hearth layer (503), bone fragments <10mm, both unburnt and burnt (Figure 7.7) are dense across the whole layer apart from the southwest corner.

Fish bones, crabs/crustaceans and eggshell

Fish bones, both unburnt and burnt (Figure 7.7), show a similar pattern to <10mm mammal bone fragments. Unburnt crab/crustacean fragments are concentrated in the north of the hearth layer (Figure 7.8) whereas burnt fragments have the same distribution as the burnt fish bones. Eggshell (Figure 7.8) is concentrated in the southeast of the hearth layer.

Stone

Worked flint

Nine tiny flakes of flint (>10mm and <10mm; Figures 7.8–7.9) were recovered, mostly from the northwest corner of the hearth layer.

Pebbles

One white, one black and 10 grey pebbles were found scattered across the hearth layer (Figure 7.8). The predominance of grey is in contrast to the relatively even numbers of white and grey in phase 4 but the sample from phase 5 contexts is very small.

Slate

A single fragment of green slate was recovered from the south end of the hearth (Figure 7.9).

Non-ceramic artefacts

The iron artefacts in 503 consisted of two nails, two roves and a clench nail, mostly distributed down the western side of the hearth layer (Figure 7.9). A bone point (SF 2717) was in the northern part of the layer (Figure 7.10). A bone pin tip (SF 2790) and a perforated limpet shell (SF 2792) were in the southern end of the hearth.

Iron, iron-smithing slag and fuel ash slag

There were just a few fragments of iron, both metal and slag, and fuel ash slag in the southeast corner of hearth layer 503 (Figure 7.8).

Spirorbis and charcoal

Both unburnt and burnt *Spirorbis* fragments (Figure 7.8) were found primarily in the northwest part of the hearth layer. In contrast, charcoal was concentrated in the southeast corner, evidently the location of the fire itself.

Dog coprolites

Two coprolites were found within layer 503 (Figure 7.10). For coprolites in other phase 5 deposits, see below.

7.5 Artefacts and other remains from the longhouse, the outhouse and their associated deposits

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

Large quantities of finds were found in contexts belonging to this phase, though only a small number came from house floors. Many finds came from the midden layers and the fill layers associated with the abandonment of the two buildings. There were fewer finds in the construction layers and pits.

Fragmentation

The contexts in this phase (Figure 7.11) are grouped into:

- floors, hearth, and footpath,
- midden (northeastern/eastern and southeastern),
- construction layers,
- pits,
- abandonment fills (of the longhouse, outhouse and the set of fill layers across the northern half of the site).

Floor, hearth and footpath layers

Quantities and distribution of debris in the phase 5 floors and in hearth layer 503 have been discussed above. Only contexts 503 (bone and sherds) and 535 (all bone and no sherds) have the classic fragmentation pattern for a floor, dominated by small-sized bone fragments. The sherds from hearth layer 503 are mostly medium-sized. The profiles of medium-sized bones – with a lot of pottery of medium size from the footpath (534), and with a little pottery from floor 522 (north end of the longhouse) and layer 352 (outhouse) – indicate rather less trampling than might be expected. The footpath fill may be mixed with lower layers and the outhouse fill is similar to the earlier, phase 4 floor (366).

Midden layers

Certain layers in the southeastern (104, 123, 129 and 220) and northeastern/eastern middens (306, 307, 318 and 419) produced too few finds to allow analysis. The assemblages from most layers are dominated by medium-sized bone fragments. The only large assemblage of small-sized bones (with a small amount of medium-sized pottery) is from layer 315 in the northeastern midden, although four medium-sized assemblages from the southeastern midden (117, 121, 124 and 128) are also dominated by small pieces. The large sherd numbers in layers 117 and 124 indicate that these layers could have come from cleaning and sweeping of the north end of the house.

With the large assemblages of medium-sized bone, there is a wide range of sherd sizes. In the southeastern midden, layer 114 contained high proportions (30%) of medium-sized sherds whilst layer 426 in the same midden had none. Also in the southeastern midden, certain layers contained small quantities of sherds, either large in size (layers 118 and 125) or small (layer 219). There is similar variation in the northeastern midden: layer 010 has a 10%–20% proportion of medium-sized sherds, layers 308, 314 and 420 have smaller quantities of medium-sized sherds, and the medium-sized assemblage in layer 309 has no sherds.

Overall, the wide variation in ceramic quantities and sherd sizes makes it likely that some or even all of these midden layers have come from sweeping or cleaning-out of the longhouse. This contrasts with earlier midden layers from phases 3 and 4, in which generally tiny sherd numbers do not indicate an interior floor origin.

Construction layers

The only large assemblage came from the upper wall core (533) of the longhouse's new north wall, and is dominated

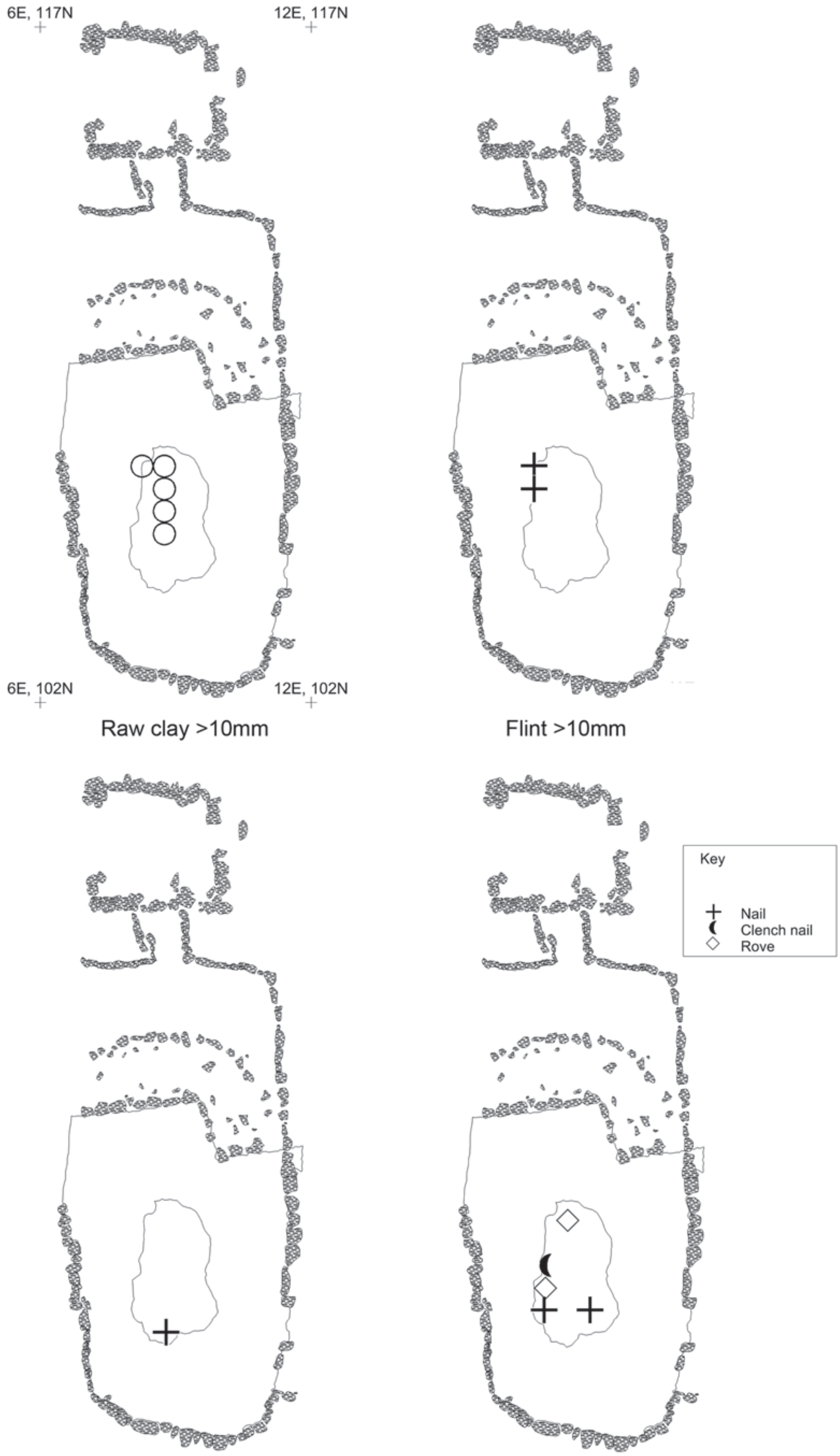


Figure 7.9. The distribution of clay, flint, slate and iron artefacts in hearth layer 503 of House 500 Stage II

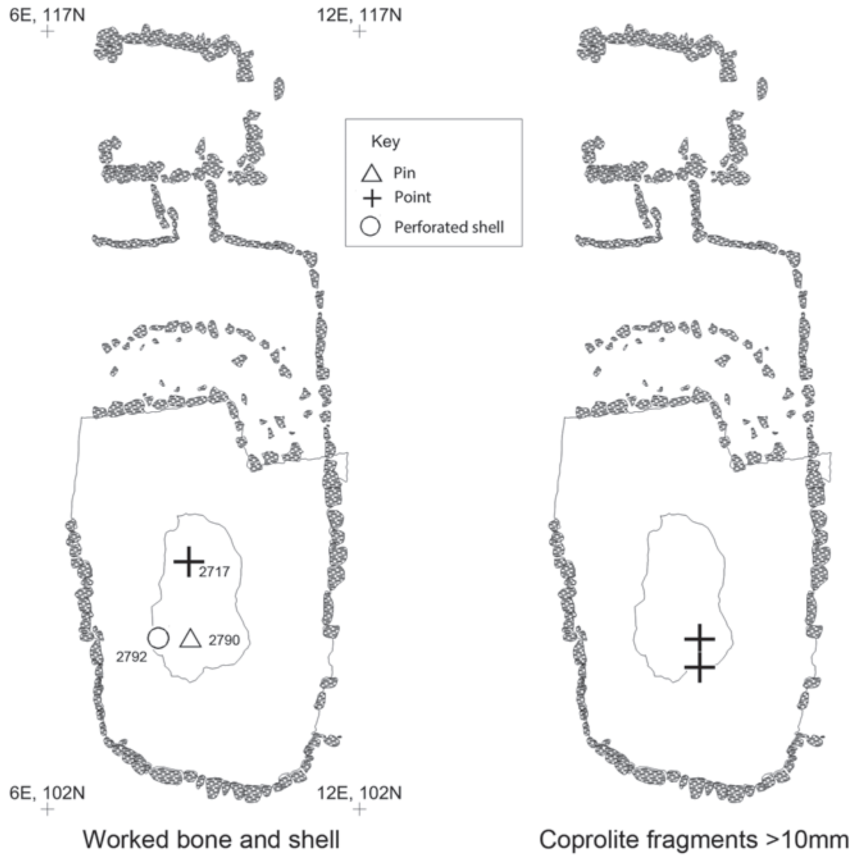


Figure 7.10. The distribution of worked bone and shell, and coprolites in hearth layer 503 of House 500 Stage II

by medium-sized bone fragments and small numbers of medium-sized sherds. Layer 530 within the east wall contained medium-sized bone fragments, with a small quantity of small sherds. Below layer 533, layer 547 at the base of the wall contained large pieces of bone and no sherds.

Pit fills and related deposits

Most pit fills contained very small quantities of bone only (fills 511 and 541) or of sherds and bone (fills 424, 505 and 515). Medium-sized assemblages from pit fills 502 and 524 are dominated by large bone fragments, with no pot in 502 and a few medium-sized sherds in 524.

Abandonment fills

Deposits filling the longhouse had mostly been removed by later activity. Layers 506, 512 and 417 produced only small quantities of material but there are large assemblages from layers 418, 507 and 517. Layer 517 contained small-sized bone fragments with very little medium-sized pottery, whilst 418 contained medium-sized bone fragments with a small number of small sherds. Layer 507 contained medium-sized bone fragments with medium quantities of small sherds. Layer 395 produced medium quantities of medium-sized bone, with just a single sherd.

Deposits over the pathway produced large assemblages from layers 386 and 397, dominated by medium-sized bone and medium quantities of small sherds, and small-sized bone with large quantities of small sherds, respectively. Medium-sized assemblages all contain medium-sized bone fragments, with large quantities of small sherds (layer 416), small quantities of small sherds (layer 441) or medium quantities of medium-sized sherds (layer 389). Numbers of sherds and bone from layers 447 and 448 are too small for analysis.

The ruins of the outhouse and the whole of the northern area of the excavation were covered by deep layers that are grouped as a single stratigraphic unit (023=313=325 =351=385):

- layer 023 lay in the northeast corner of the excavation;
- layer 351 lay over the entire northwest area (covering the outhouse);
- layer 313 lay along 351's east side;
- smaller deposits (producing only medium-sized assemblages) were on the south (385) and southeast (325) sides of layer 351.

The fragmentation profiles of this group of layers are all different:

- The assemblages from layers 023 and 351 have small-sized bone fragments with, respectively, medium and very small quantities of small sherds.
- Layers 313 and 385 have medium-sized bone fragments with, respectively, very large and large quantities of small sherds.
- Amongst the medium-sized bone fragments of layer 325 there are a few sherds of medium size.

Overall, the relatively high ratio of sherds to bones in these abandonment fills is unusual, and these contexts produced a high proportion of the pottery from phase 5. Since the buildings were already in ruins when these layers were deposited, this material might have come from elsewhere, from contexts producing broken pottery in quantity.

Bone, antler and metal artefacts

Certain layers within this phase produced surprisingly large numbers of iron, bone and antler artefacts. The comb, chisel and broken knife in layer 547 – the base of the core of the new east–west wall – may constitute foundation deposits, especially since the layer contained no pottery. Other possible but less likely foundation offerings are the comb fragment, the incomplete bone needle and the repeatedly bent iron needle in the upper wall core deposit (533). As well as the artefacts from 533 listed in Table 7.1, this wall core deposit also produced five pieces of iron-working slag (see Chapter 17) and a large quantity of slate (see Chapter 16).

A complete nail-headed bone pin from floor 522 might have been a closing deposit for the floor of the longhouse. A reel-headed pin from floor layer 535 might have been lost rather than placed (although a complete pin was found in this same location in phase 3). Otherwise the artefacts associated with the occupation surface are all from hearth layer 503 and are not out of the ordinary (Table 7.1).

The richest surface deposit of phase 5 was the pathway (534) linking the longhouse with the outhouse. Artefacts from this layer (Table 7.2) include a bone pin-head with Ringerike decoration, a large block of slag and another three smaller pieces.

Within the middens, the number and range of artefacts are much greater in the northeastern midden than the southeastern, as in phases 3 and 4. Artefacts from the southeastern midden (Table 7.4) include only one comb fragment, one bone pin fragment and 21 iron items: this area of midden is very impoverished in these categories even though it has more pottery than the northeastern midden. In contrast, the northeastern and eastern midden together (Table 7.5) have 34 antler/bone artefacts, 115 iron items, a copper-alloy pin and a copper alloy-coated iron weight. Flax heckle teeth, a broken iron needle, two cauldron suspension hooks, a piece of cauldron and a variety of broken fittings all attest to domestic activities represented by the northeastern and eastern middens' debris. The layers in the northeastern midden that produced the greatest number of artefacts are 010, 308 and 315 (Table 7.5).

If all the middens east of the house had the same source within it, how can these differences be accounted for? One possibility is that those particular midden layers that produced very high numbers of non-ceramic artefacts were perhaps the residues of major refittings or 'spring cleans' whereas the southeastern midden was more the debris of mundane cleaning events. The fact that this distinction in the midden deposits between north and south has been present all the way through from phase 3 indicates that there was a tradition or practice of separating particular kinds of rubbish into different piles.

The pits were largely devoid of artefacts but certain of the abandonment fills had large quantities of all kinds of non-ceramic artefacts, especially layer 507 and the thick terminal layers of 313 and 351.

Among the bone/antler and iron artefacts (Table 7.1) from layer 507, at the north end of the house, are a comb fragment, a reel-headed bone pin, a flattened-head pin, a knife, and a piece of slag.

An unusual find from abandonment fill 313 was a small fragment of human skull; together with an unshed deciduous tooth from floor 535 (and a pelvis fragment from 333 in phase 3), these are the only human remains from the settlement other than shed deciduous teeth (see Chapter 20). The artefacts from layer 313 (Table 7.3) include a sherd of Minety ware from a pot deposited in phase 4 (see Chapter 6), an antler sleeve fragment that belongs to the same artefact as a fragment from layer 397 of the pathway, comb fragments, a nail-headed bone pin, a whale bone dish and three pieces of slag.

Abandonment layer 351 produced the greatest quantity and range of artefacts (Table 7.3), including many comb and comb case fragments, bone pins and points, iron and bone needles, a possible gaming counter and a piece of slag. Finds from abandonment layer 023 include a bone mount that probably decorated a wooden box; another piece of decorated bone mount from phase 7 probably belonged to the same box (see Chapter 13.4).

Abandonment fill 386 (covering the path and outhouse passageway) produced only one bone artefact but several unusual iron objects, including a possible knife tang and a broken socketed gouge or chisel (Table 7.2)

The very large numbers of iron and bone/antler artefacts from these abandonment fills may relate to the demolition, breakage, sifting and scavenging that might have gone on at the abandoned house and its middens after any occupation had ceased.

Iron-smithing slag and fuel ash slag

Thirty pieces of slag and one of fuel ash slag came from phase 5 contexts. Five pieces came from the upper wall core 533, perhaps revealing that the origin of this building material was on the northeastern edge of the mound where ironworking debris is most dense. From the northeastern midden itself came 11 pieces and a piece of fuel ash slag from layer 308. Four pieces of slag came from the northwest part of the site (layers 313 and 351). One piece came from surface 352 in the outhouse.

Ceramics

In phase 5 there is a shift towards greater proportions of larger vessels, with rim and base diameters between 180 and 350mm, which sets the trend for the next two phases 6 and 7. This change in vessel size is unlikely to relate

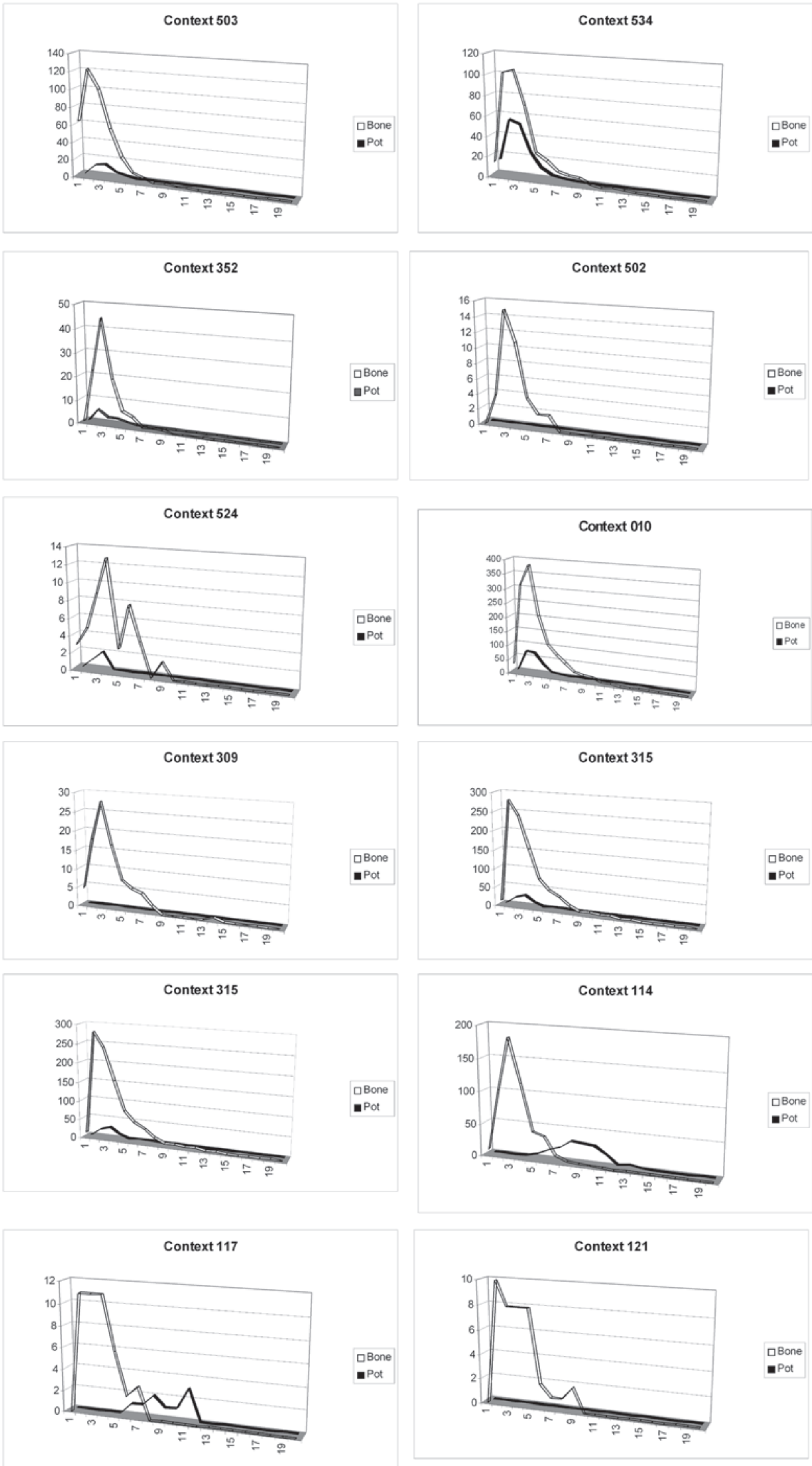


Figure 7.11. The fragmentation of sherds and bones in phase 5 floors (503, 534, 352), pit fills (502, 524), northern midden (010, 309, 315) and southern midden (114, 117, 121)

to household size since the interior floor area was much reduced after phase 4.

In terms of surface finish, there is a move away from producing rough surfaces and a greater number of surfaces with organic impressions. The use of rounded basal angles (RBA) also tails off, and examples are only present in any numbers thereafter in phase 9. The proportion of convex as opposed to curved profiles becomes more exaggerated in phase 5 and there is a slight increase in the use of flat rounded rims (type 4 in Figure 12.1) at the expense of flat rims (type 2) and rounded rims (type 1). Colours of vessels also shift, with greater use of brown, orange and pink surfaces on pots, and of brown and orange on platter exteriors.

In terms of the use of the pottery, there is an increased percentage of blackened sherds whilst percentages of sooted and residue-containing sherds are also up slightly on phase 4 totals. Conversely, the percentage of off-white residue drops to 4.3%. The numbers of conjoining sherds in phase 5 are not as high as in phase 4 and are principally from the middens and the abandonment fills. Numbers of conjoins are equally divided between north and south except that most of those in the northeastern and eastern middens are found in just three layers (010, 308 and 315). The high proportion of conjoins from abandonment fills indicates a lot of freshly broken pottery being deposited in these layers.

Platter ware

Phase 5 sees greater use of heavy grass-marking on platter exteriors and a decline in the number of thin platters. At the same time, platter ware now constitutes about half of the total ceramic assemblage.

There is an interesting distribution of platter ware within the midden layers. Most sherds come from one layer, 010 (86 sherds) and there are fewer than 20 platter sherds in the rest of the northeastern midden with 68 sherds in the southeastern midden. Platter proportions also vary considerably in other layers. They are high in the path layer 534 and in sand layer 506 and fill layer 507 but very low in the terminal fills 351 and 313.

Clay

Clay was found in hearth layer 503 and floor layer 522, with one small lump of tempered grey potting clay coming from a pit fill (524) in the east of the longhouse. Unlike earlier non-floor contexts containing clay, this layer did not contain large quantities of sherds.

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 5 contexts yielded the largest assemblage (NISP = 2,281) of identifiable mammal bone. The changes seen in cattle and sheep/goat proportions for phase 4 are reversed: the proportion of sheep/goat fragments declines whilst that of cattle increases markedly. The proportion of pig continues to decline slightly. Other domestic species present are goat, dog, cat and horse. Amongst the wild species, red deer increase in relative abundance. A few fragments of roe deer are also present, as are hare and seal.

Another large sample comprising 1,934 fragments of identifiable fish bone >10mm and 187 fragments <10mm (total n=2,121) was examined from phase 5 deposits. Cod remains the dominant species (38%) in the >10mm sample, with herring being dominant in the <10mm assemblage (95%). Eel are also present.

Wood charcoal

P. Austin

Wood charcoal was recovered from both the hearth of House 500 and from the two midden areas. Only four taxa were identified in the southeastern midden sample (Heather was the most common, followed by Larch, Pine and Alder). In contrast, at least seven taxa were identified in the northeastern midden sample (Larch, Larch/Spruce, Alder, Heather, Hazel, Honeysuckle, Elder and Willow/Poplar) even though the same number of fragments was examined from each area of midden. Charcoal from the hearth (503) within House 500 included only two taxa, mostly Heather and some Hazel.

Dog coprolites

Two coprolite fragments were found in hearth layer 503 (see Figure 7.10). None came from the ephemeral floors 522, 538 and 537 but they were recovered from floor 535 on the east side of the house. As well as the numerous coprolites in layer 128 in the forecourt, they were also found in the outside pathway (534), in the wall core (533), and within the deposits that accumulated at the end of phase 5 within the ruined house and above the pathway, in layers 507, 385, 386 and 397.

7.6 Overview

M. Parker Pearson

The east–west wall forming the north end of the modified House 500 Stage II was built in *cal AD 1070–1125* (*95% probability*). The inhabitants of House 500 appear to have suffered a reversal of fortune, at least in terms of their numbers. This re-build more than halved the size of the longhouse, from over 50sq m in Stage I to around 25sq m in Stage II.

The north room (Structure 353) was turned into an outhouse, reached by an external footpath rather than a passageway. There is no indication of the outhouse having the intensive use that it received in phase 4; if this free-standing outhouse was used at all before its roof came off and it filled with windblown sand, it was probably only as an outside store.

In terms of consumption, the quantities of waste materials in the middens increased in this phase, with

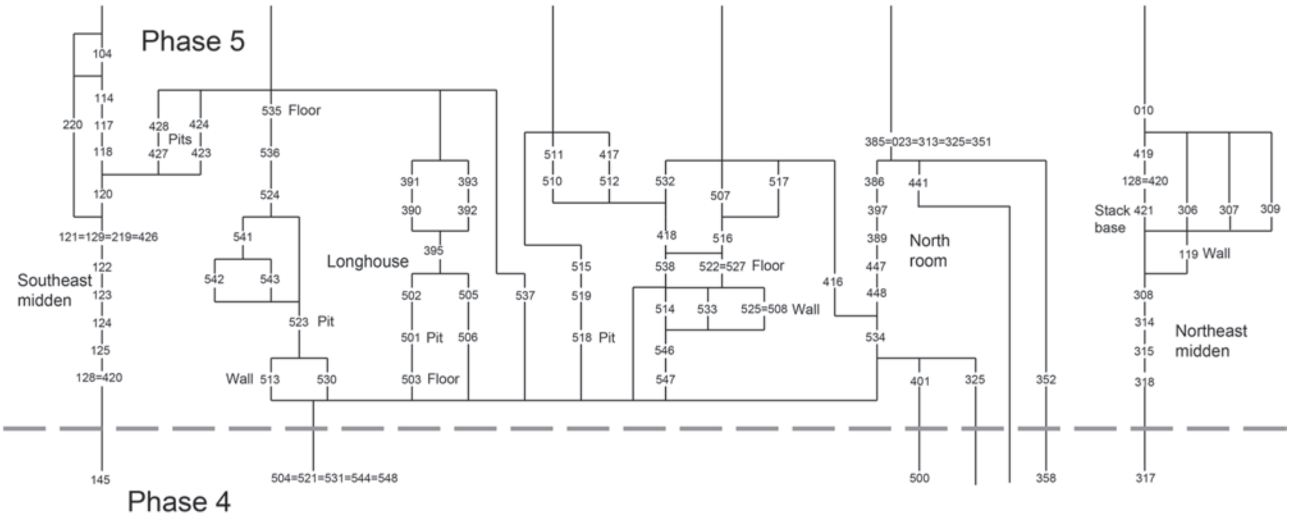


Figure 7.12. Stratigraphic matrix of contexts in phase 5

large quantities of animal bone, broken iron, bone and antler tools, and pottery sherds. Beef was eaten in greater proportions than in previous phases. The interesting discrepancy between waste dumped in the northeastern midden and waste in the southeastern midden raises the possibility that different materials were separated between the two middens, the northeastern midden receiving more artefacts and a wider variety of wood charcoal. Increasing capacities of pots probably relate to changing fashions rather than to the size of the household.

Agricultural activities are demonstrated by the presence of a probable stack-base, formed by a square setting of burnt cobbles, on top of earlier midden deposits. Structures of this kind are known from recent times as the bases for haystacks. Barley was the dominant crop (see Chapter 21). Flax was made into fabric using iron heckles; wool was carded with an iron comb. Ironworking was being practised somewhere just to the east of the excavated area (see Chapter 17). Fragments of iron cauldron and suspension hooks reveal the use of non-ceramic cooking equipment, presumably on the longhouse's hearth.

Ultimately, the house was abandoned and replaced in phase 6 by a pair of sheds. Barbara Crawford (see Chapter 25) asks whether the decline in architectural size between phases 4 and 5 might have been linked to the devastation wreaked by the Norwegian king Magnus 'Barelegs' Olafsson, who attacked the Uists in AD 1098, taking the inhabitants' 'land and life'. Though the house was clearly not sacked or burnt, the reduction in its size could certainly be linked to a reduction in the number of inhabitants of the farmstead. The presence of human remains from a child and an adult/adolescent in this phase suggests violence and disruption: Cille Pheadair may have been affected by the Norwegian war-raid.

8 The sheds (phase 6), constructed *cal AD 1100–1155*

M. Parker Pearson and M. Brennand
with contributions by H. Smith, H. Manley, P. Marshall, J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

8.1 A break in the sequence of inhabitation

M. Parker Pearson and M. Brennand

After the modified House 500 went out of use, its floor was covered in the final stages of phase 5 by a series of windblown sand layers (*e.g.* 395, 418 and 516) and other layers (*e.g.* 507, 512 and 517). To the north, layer 023=313=325=351=385 covered the outhouse ruin and the whole of the northern part of the site. The very large quantities of ceramics, bone debris, and non-ceramic artefacts in the uppermost layers of phase 5 point to a period of dismantling, discard and abandonment. Thereafter, the settlement mound seems not to have been occupied by a dwelling until phase 7.

With the top of House 500's northern wall (525, 514, 533) almost entirely buried by the phase 5 abandonment deposits, the flat surface of these deposits was used for the construction of two small and rather curious buildings, Shed 406 later abutted by Shed 400 (Figure 8.1).

Shed 400 was a sunken-floored building whose north wall was constructed on the top of House 500's inner wall face (514; phase 5). Its south wall did not survive, having been destroyed by the construction of House 312 in phase 7. Consequently we have no clear idea of Shed 400's original size and shape. Shed 406, in contrast, had surviving walls and was almost square in plan. After the two sheds had been dismantled, a third (365) was erected on the spot. The only other structure associated with phase 6 was a small rectangular spread of cobbles (350), which lay about 4m to the north of Shed 400.

It seems that the Cille Pheadair farmstead mound was used only for insubstantial outbuildings in phase 6: there is no evidence for prolonged occupation, in the form of substantial hearth deposits or deep floor layers. Where the users of these outbuildings lived is unknown - they might have had their longhouse nearby (at site 81 for example [see Chapter 1]) or further afield within a different township area. Phase 6 represents an important break in the sequence of occupation and raises the possibility that the inhabitants might have died out or moved away towards the end of phase 5.

8.2 Pre-construction layers

M. Parker Pearson and M. Brennand

A series of layers accumulated on top of the ruins of House 500. The first of these was layer 394, a friable dark brown sand covering the north wall-top of the Stage II House 500 and extending northwards towards the buried outhouse. Layer 394 covered the final phase 5 layers 507 (a grey-brown sand) and 517 (a grey sand); these lay within the ruined walls of House 500 whereas 394 went over the walls (Figure 6.4).

A worn silver quatrefoil penny of King Cnut (reigned AD 1016–1035), minted in York, was found within this midden-like deposit (394). A radiocarbon date of cal AD 980–1170 at 95% probability (SUERC-4881; 980±40 BP) was obtained on carbonized residue from layer 394. Given the modelled radiocarbon date range of *cal AD 1100–1155* (*95% probability*) for the construction of Sheds 400 and 406, this coin was probably about a hundred years old when deposited, since its estimated date of production is AD 1017–1023 (see Chapter 13.17).

Between layer 394 and the turf wall 407 of Shed 406 (Figures 3.2, 8.2), there was a sequence of spread deposits. A clean, yellow-brown windblown sand (415) had covered 394. On top of it a spread of red-brown midden deposit (398) covered the area as far as 1.50m north of the sheds. In turn, this was covered by a clean, grey windblown sand (408). It appears that, within Shed 406, these three layers

were removed until the top of 394 was exposed for use as a floor surface.

8.3 Sheds 406 and 400, and their replacement Shed 365

M. Parker Pearson and M. Brennand

These small rectangular buildings were built on an east–west axis. They have been termed 'sheds' because they contained no hearths and appear to have been storage facilities placed at some distance from any dwellings.

The first was Shed 406, a rectangular building just 2m wide north–south and slightly longer on the east–west axis. Cut into its east end, and possibly contemporary with its later use, was a second, square shed (400) with a more deeply sunken floor. After Sheds 406 and 400 had both gone out of use, a third structure (365) was erected over their abandonment fills. This had an east–west wall just 1.30m long but its other dimensions are unknown.

Figure 8.1. Simplified plan of phase 6 structures within the ruins of House 500

Shed 406

Two east–west aligned walls (406) were placed directly onto the midden deposit (394) within the northern end of the abandoned House 500, abutting the house's west wall and utilizing a stretch of that wall for the shed's western side. The northern wall (406) was 2.20m long and survived up to four courses in height. Parallel to this, the southern wall (also 406) only survived to a length of 0.70m east–west and stood up to three courses in height. The eastern extent of the shed is unknown. The walls were constructed of randomly coursed, unworked beach cobbles and enclosed an area 2m north–south and at least 2.70m east–west. The north wall was revetted on its northern side into a linear deposit of reddish-brown organic sand (407), interpreted as a decayed turf wall.

Floors

The surface of the midden layer 394 seems to have formed a floor layer within Shed 406 and it was excavated in 0.50m sample squares. Above it, the earliest feature within the interior of the shed was a double line of long, flat beach cobbles (399), running centrally on an east–west alignment but with the long axis of the individual stones aligned north–south (Figures 8.2–8.3). It is unclear whether the stones (399) were a laid surface or the foundations of a truncated internal feature within the shed. Perhaps they were the base for a drying rack.

The second surviving floor layer within Shed 406, above 399, was a friable dark brown sand (382) with charcoal inclusions (Figure 8.4). A carbonized residue from layer 382 was radiocarbon-dated to cal AD 1000–1170 at 95% probability (SUERC-4880; 965±35 BP). The eastern half of 382 was covered by a compact yellow/brown sand (381) with charcoal inclusions. On top was a friable brown sand (380) covering the north and southwest surfaces of the building (Figures 3.2, 8.4). Both of these thin layers might have been floor surfaces but were not gridded into squares for sampling during their excavation.

The roof of the structure appears to have come off at this stage, since a fringe of white windblown sand (379) lined the shed's western, northern and southern sides. The whole of the interior was then filled with another grey-brown to off-white windblown layer (377), covered by a 100mm-deep layer of white windblown sand (376) (Figure 8.5). A carbonized residue within layer 376 produced a radiocarbon date of cal AD 890–1030 at 95% probability (SUERC-4879; 1080±40 BP).

Shed 400

To the east of Shed 406, the stones (399) were abutted by two large vertically-set stones and overlain by an east–west aligned wall of randomly coursed, unworked beach cobbles (400) surviving up to five courses in height and placed directly onto house wall 514 (of phase 5), forming an enclosed area 1.90m east–west. Within the break between

Figure 8.2. Sheds 400 and 406 with stack-base 350

Figure 8.3. Laid stone layer (399) within Shed 406, viewed from the west

wall 514 and an area of beach cobbles (532; phase 5), there was a low-lintelled niche or 'cupboard' (Figures 8.6–8.7). To the north the wall 400 butted against a single line of east–west aligned stones (413) that was revetted into a dark grey-brown sand, possibly a decayed turf wall (404). Access to the shed was probably from the east, over the threshold stones of House 500's Stage II (stones 401, phase 5; Figure 8.2). The southern extent of Shed 400 could not be established.

The floor

Layer 374, although a floor layer, contained no sherds or bone fragments and only one small find, a pierced whale vertebra (Table 8.1).

The shed was almost wholly filled by a homogeneous, loose light grey sand (367) with stone inclusions (Figure 8.4). A carbonized residue from layer 367 produced a radiocarbon date of cal AD 1020–1240 at 95% probability (SUERC-4878; 890±40 BP). Within the niche in wall 400, a loose light grey sand (373) contained an assemblage of large fragments of platter ware in three layers, placed one on top of each other, including several broken but largely complete vessels (Figure 8.8). Outside, to the north, the line of stones (413) and their associated layer 404 were covered by a light brown sand (411).

The replacement shed 365 built on top of shed 406

To the north of stone wall 406 and turf wall 407, overlying the midden deposit 398, there was an isolated rhomboid-shaped, small patch of brown organic sand (402) that might have been turf collapsed or removed from wall 407. Immediately east of it was another small rectangular patch of yellow-brown sand (403) with shell and bone inclusions (Figure 8.2). These and the sand (411) covering the northern edge (413) of Shed 400 were all covered by an extensive, dark brown organic midden deposit (341=396; Figure 3.2) with abundant shell inclusions. The midden layer 341=396 thus accumulated during a period when Sheds 400 and 406 had gone out of use.

The next phase of construction was commenced by the cutting of an east–west wall (365) through 341=396. This wall was 1.3m long and survived to three courses high, fizzling out to a single stone at its west end. It had once formed the northern side of a shed-like structure on the same location as Shed 400 and overlying 376 (final sand layer of Shed 406) and 367=373 (the fill of Shed 400). The wall was constructed of unworked, randomly coursed beach stones and incorporated a large piece of blue whale bone (Table 8.1) close to its western end (Figures 8.9–8.10).

Floors

The floor layer (369) for Shed 365 lay on the south side of its surviving wall (Figure 8.4). Layer 369 was a dark grey sand just 30mm thick, lying above the abandonment fill (367=373) within the adjacent Shed 400. Above it was another thin and patchy sand (364), with mixed dark grey sand, orange peat ash particles and charcoal. Layer 364 might have formed either a final floor layer or a destruction layer. It was covered by fill layers of dark grey sand (360) under light grey-brown sand (357).

8.4 Construction of the sheds

M. Parker Pearson and M. Brennand

It appears that the phase 6 sheds were constructed as miniature versions of the earlier dwellings, but only slightly sunken into the ground (and Shed 365 appears to have sat on the ground surface). A low stone revetment wall was set

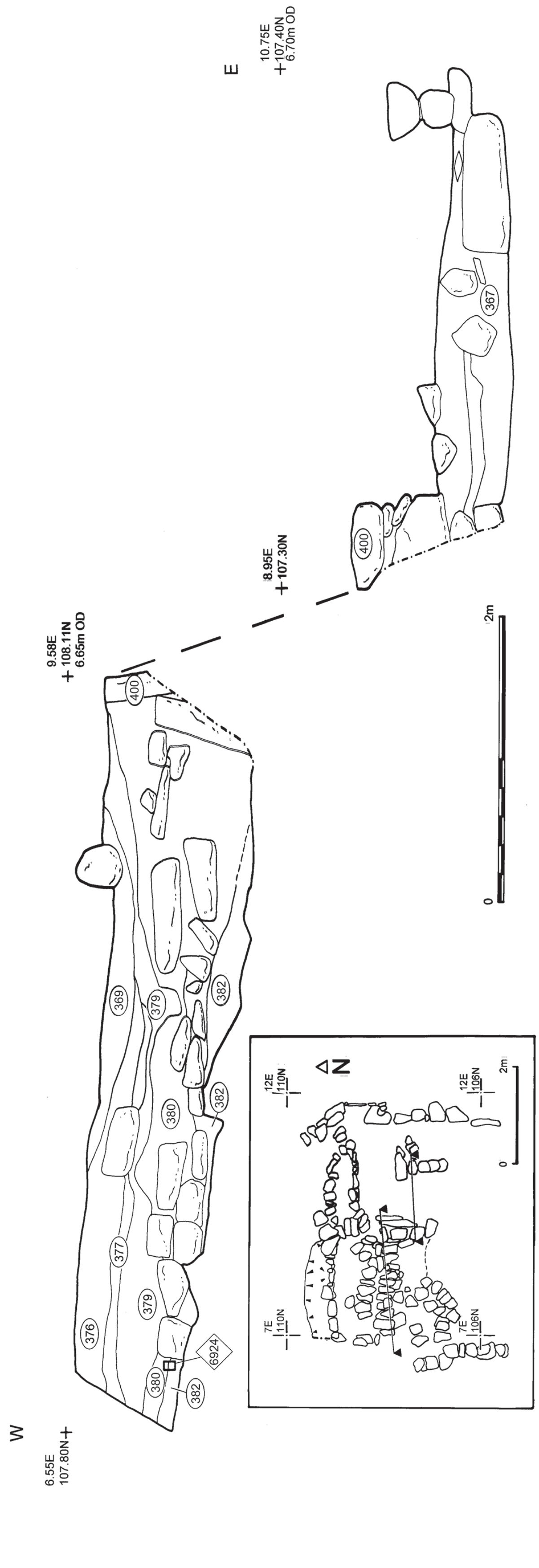


Figure 8.4. Sections through the floors and fills of Sheds 400 and 406

into a bank of turf 0.30m wide, which appears to have had no exterior cladding, the same building technique used for the longhouses. Thus the entire wall was only 0.50m thick and presumably rose to a height of about a metre or more. There were no interior postholes and, as seen in the longhouses, the roof seems to have been supported entirely on the walls. We might thus envisage a scruffy-looking turf shed, with a flat or pitched roof, in which the only stonework was a low drystone wall to knee-height around the interior face.

There was no sign of any doorway to Shed 406 so presumably it was positioned on either the west side (eroded by the sea) or the east side (cut away by Shed 400). The doorway to Shed 400 was at the north end of the east side, reusing the threshold stones (401) of the second, northern door of the previous longhouse (phase 5). Shed 365 was too poorly preserved to identify the position of a doorway.

There was no formal or even informal hearth within any of the sheds. They can be compared to the small field bothies, in use into the twentieth century, which were used by crofters as temporary shelter from the elements while working in the fields (see figures in Raven 2012b). Consequently these buildings are considered to have been sheds, used primarily for storage.

8.5 The working floor or stack-base (350)

M. Parker Pearson and M. Brennand

A layer of cobbling (421) in phase 5, located on the east side of the site, may be the remains of a stack-base but it could also be an outdoor working area. A second such cobbled area was found on top of the deep sand layer (351=313=325) at the end of phase 5, just above the buried southeast corner of Structure 353. It is placed in phase 6 because the outhouse (353) used in phase 5 was entirely buried by this time.

The arrangement of stones formed a small sub-rectangular platform (350) of burnt cobbles (about 2.60m across but mostly concentrated within a sub-square area 1.40m east–west by 1.10m north–south; Figures 8.2, 8.11). The grey-brown sand from amongst the stones contained charcoal, some animal bones, a few iron nails and roves and a broken whale bone beater or paddle with a serrated end, possibly a scutching tool used to beat flax (Table 8.1). A large cetacean vertebra (SF 1416) set amongst the cobbles appears to have been a structural fitting. The fragmentation pattern suggests this cobbled area was an outdoor working floor (see below).

8.6 Abandonment deposits

M. Parker Pearson and M. Brennand

The abandoned Shed 365 filled with windblown sand (360) and was eventually covered by a light grey-brown sand (357).

A series of deep 'midden' layers were deposited within and on top of Sheds 406 and 400, notably 341=396, 367=373, 379, 377 and windblown sand 376. Just where the material within these came from is problematic.

Figure 8.5. Detail of the long beach section, with the north–south section through Shed 406 in the centre of the photograph, viewed from the west

Figure 8.6. The niche in the northwest corner of Shed 400, viewed from the southeast

8.7 The spatial patterning of debris within the shed floors

M. Parker Pearson, H. Smith, H. Manley and P. Marshall

The certain and possible floors of the three sheds in this phase were:

- 394, 381, 380 and 382 within Shed 406;
- 374 within Shed 400;
- 369 and 364 within Shed 365.

Only two were gridded for sampling: 382 and 394, and only the northern half of 394 and the southern half of 382 contained sufficiently thick deposits for flotation. Floor 374 contained no material and floor 394 is uncertain because

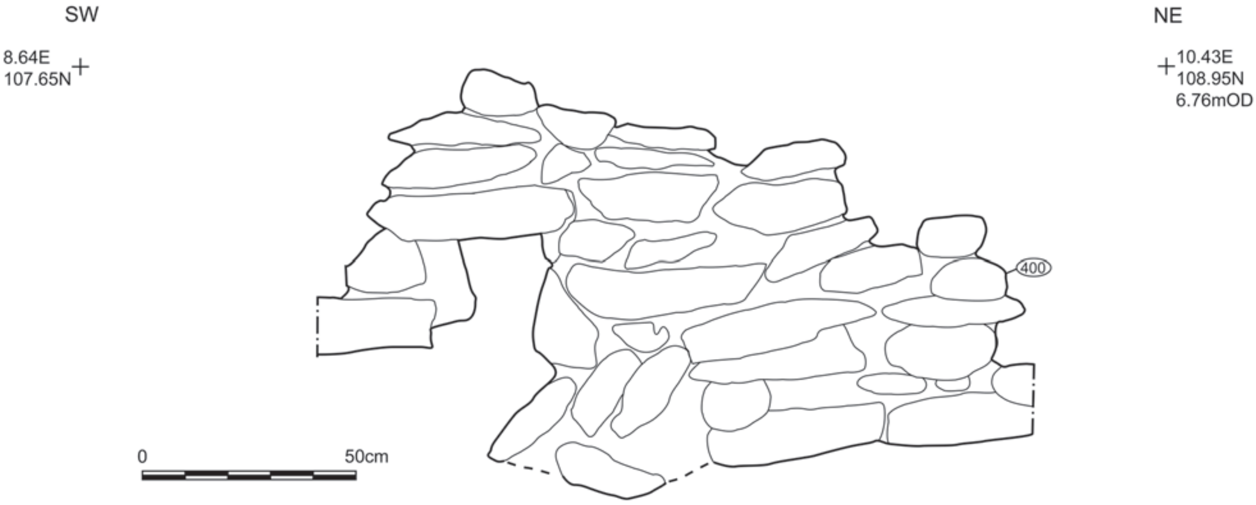


Figure 8.7. Elevation of the wall of Shed 400, showing the position of the niche

Figure 8.8. The platter within the niche in Shed 400, viewed from the southeast

it was the sunken surface of a midden layer (see section 8.2). Layers 381, 380, 369 and 364 were not gridded for sampling but can be assessed on the basis of their single environmental samples and amalgamated finds. Given the small spatial units and the inconsistencies in sampling, it is best to consider each floor in turn.

Floor 394

Where this midden layer lay within the shed's interior as a floor, it produced little debris, just small to medium-sized bone fragments along the north wall of the shed, and six sherds (Figure 8.12). Four of the sherds were also found against the north wall and two came from a sample square

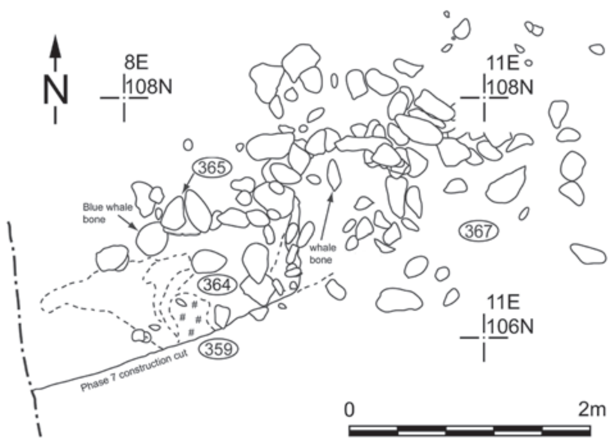


Figure 8.9. Plan of wall 365

Table 8.1. Phase 6 non-ceramic artefacts by context and context type

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 6				
PRECONSTRUCTION				
pre-construction layer/floor	394	1672	silver penny of Cnut	
		2730	bone point	
		see Chap 15	iron rove, nail, plate fragment	
midden	398	1639	comb tooth-plate	
		1883	transversely flattened-head bone pin fragment	13.13
		1640	bone awl fragment	
		1641	bone point, tip broken	
		2731	bone point	
		see Chap 15	tanged iron arrowhead, fitting	
windblown sand	408	2739	bone point	
		2738	bone artefact fragment	14.3
SHED 406				
fill/?floor	381	1570	bone pin fragment	
		see Chap 15	iron nail	
windblown sand	376	1550	polished stone	
		see Chap 15	iron chisel	
SHED 400				
stones	413	1870	complete bone point	
wall	404	see Chap 15	socketed iron arrowhead, nail	
floor	374	1483	cetacean bone tool	
fill	367	1872	fragment of a single-sided composite comb	13.5
		1493	worked antler tine	
		1576	worked antler beam	
		1464	whale bone chopping-block	
		1581	whale bone tool	
		1474	grinding stone	
		see Chap 15	iron clench nails, roves, nails, bars, plate fragment, unident fragments	
niche	373	see Chap 15	unident iron fragment	
SHED 365				
midden/wall	403	1615	transversely flattened-head bone pin fragment	13.13
		1616	worked antler tine	
midden	341	1571	comb tooth-plate	
		1429	bone point fragment	
		2729	bone point fragment	
		2698	bone artefact fragment, possibly part of a cross	14.3
		1400	worked cetacean bone	
		1587	worked cetacean bone	
		1449	stone polisher	16.2
		see Chap 15	iron nail strip, unident fragment	

Table 8.1. continued

wall	365	1487	large piece of worked whale bone	
floor	369	1465	broken hone	16.3
		see Chap 15	iron nail	
fill	357	see Chap 15	iron clench nails, nail, unident fragment	
WORKING FLOOR OR STACK-BASE				
	350	1585	whale bone scutching tool	14.6
		1416	whale bone vertebra stand or socket	
		see Chap 15	iron clench nails, rove, nails, unident fragment	

Figure 8.10. Wall 365, viewed from the south; the whale bone protrudes from the stonework (left)

on the westernmost side that also contained a nail and seven pebbles. (Other artefacts from layer 394 came from outside the shed; see section 8.9).

Just possibly this small concentration of finds on the west side represents the position of a west-facing doorway where material was dropped. Alternatively, since the remainder of the interior was clean, this northwest corner was the area into which debris was swept. We also cannot rule out the possibility that this material comes from the underlying midden and not from activity within Shed 406 (though this is unlikely given the corner distribution of the finds). Note that further material from layer 394 was found outside the shed walls.

Floor 382

In contrast to floor 394, the bones, sherds and pebbles in layer 382 were concentrated in the centre of the floor, with sherds extending into the western area and all but one of the pebbles in the east. The 16 sherds were of medium size and the bone fragments were of small to medium size (Figure 8.12), with a concentration found in one sample square against the western edge. As with floor 394, this concentration on the south side of the west wall could be interpreted cautiously as evidence for a doorway here. A single lump of unfired grey-green gneiss-tempered potting clay came from the middle of the east side. This was the only such find of raw clay from the sheds' floors: although a single lump is not much to go on, its presence may indicate that floor 382 was used to store or even work potting clay.

Floor 381

No spatial data are available but a number of finds came from this putative floor layer, including a battered flint strike-a-light, a bone pin fragment (Table 8.1) and seven pebbles. Only one find, an iron nail, was recorded three-dimensionally, against the middle of the south wall. The fragmentation profile of bones (n=64) and sherds (n=18) shows that small sizes predominate but with several large pieces.

There are six sherd conjoins from this layer, with cross-joins to sherds from possible floor 380 above it and from the abandonment layer 367 within the adjacent Shed 400.

Floor 380

As with 381, no spatial data are available. This layer

Figure 8.11. Stack-base 350 during excavation, viewed from the north

similarly produced a battered flint strike-a-light and just two pebbles. The slightly larger numbers of bone fragments (*n*=80) but fewer sherds (*n*=14) were of medium size, suggesting not much trampling. This fragmentation pattern suggests that layer 380 may have been a fill rather than a floor.

Floor 374

The only find from 374 is a pierced cetacean vertebra (Table 8.1), found in the centre of the shed. Otherwise the surface was entirely clean and the only material to cast light on the room's use is the nest of broken platter fragments laid carefully within the niche in the northwest corner (Figure 8.8).

Floor 369

The artefacts from this layer consisted of a hone lying in the middle of the southern side of the building, and an iron nail (Table 8.1). There was no pottery at all and the large quantities of bone fragments are dominated by those of small size, indicative of a heavily trampled surface (Figure 8.12).

Among the floor layers, only floor 369 produced remains of dog coprolites although others were found in various layers of midden and fill (see below).

Floor 364

The only finds from this layer, a possible floor, were three sherds, together with three pebbles and 33 medium-sized bone fragments. Its character is more that of a fill than a floor.

8.8 Soil micromorphology of the shed floor

C. Ellis

Three bands were visible in sample 6924 (MM11; Figure 8.4). The lowermost band is a windblown sand with very few windblown charcoal fragments, interrupted by a wedge of wood ash; this is covered by a continuation of the 'dirty' windblown sand (382). A band (380) of peat/turf ash with a significant wood ash component sits on top of 382. This boundary between 382 and the sand beneath represents what must have been a sudden cessation in the accumulation of the windblown sand and/or the rough levelling of the surface before the accumulation of the ash in a series of thin layers. There is some horizontal orientation of the larger mineral grains and a slight fining upwards in the sequence of the ash laminations; it may be that ash was dumped and deliberately spread on at least three separate occasions.

The upper boundary into the overlying windblown sand is also sharp and marks a rapid return to the accumulation of 'dirty' windblown sand, with a few more rounded clasts of peat/turf ash than are seen in the lower windblown sand deposit (382). The survival of thin ash laminations indicates that this deposit was not subject to significant post-depositional disturbance.

A sample (MM5) through the turf wall (407) and windblown sand (408) beneath it revealed three layers. The lowermost and upper bands are windblown sands with a few fragments of peat/turf ash, and very few fragments of herbivore dung in the upper band. The central band comprises a windblown sand with a high ash component including peat/turf ash, wood ash and some herbivore dung ash as well as a few fragments of bone. The boundary

between the lower layer and the central is sharp whereas that between the central and upper unit is diffuse and faint.

If the central band does represent a machair turf then it is likely that the turf is inverted, with the upper windblown sand representing the truncated machair sand upon which the turf developed, and the lower layer perhaps the base of an overlying turf or a later accumulation of windblown sand. The central band is dominated by ash residues and is more typical of an ashy midden deposit.

8.9 Artefacts and other remains from the sheds and associated deposits

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

The artefacts from phase 6 present some striking differences to those of earlier and later phases, emphasizing the unusual and restricted nature of the activities in this period of use. As well as the certain and suspected floors discussed above, the remaining contexts can be grouped into:

- the cobbled surface (350),
- pre-construction layers,
- construction layers,
- abandonment fills.

Fragmentation

Floor layers have already been discussed. The other surface is an outdoor one, the cobbles (350). The remainder of the deposits are abandonment fills and midden layers. The latter indicate that rubbish was being dumped here even though the mound appears to have been uninhabited.

The working floor or stack-base

The large number of heavily fragmented bones and the much smaller proportion of small sherds form a classic profile associated with non-interior surfaces (see Parker Pearson and Sharples 1999). Rather than its being the base of a haystack, this surface is better interpreted as an outdoor working area on which bone was fragmented and trampled into very small pieces.

Pre-construction and midden layers

Layers 394, 415, 398 and 408 are a series of deposits that pre-date the structures of phase 6. That part of layer 394 lying within the interior of Shed 406 was used as a floor.

Only layers 394 and 398 produced large assemblages, both containing medium-sized bone fragments and medium (20%–30%) quantities of small or medium-sized sherds. Middling quantities came from the two windblown sand layers (408 and 415), with large bone fragments and no pottery in 408 and, unusually, with twice as much pottery (medium-sized) as bone fragments (medium-sized) in 415 (Figure 8.12).

Layer 415 is unusual in having more sherds than bones and might have been formed by a small collection of refuse being dumped into accumulating windblown sand. Otherwise, only the material in layers 398 and 394 appears to have derived from household waste, with the material in layer 408 perhaps accumulating from outdoor working.

Construction layers

Layers 407 and 404 produced medium or small numbers of finds, as did the sand within the stonework of the cobbled area (399) and east–west line of stones (413). Only a few bone fragments came from 399. Medium quantities of large bone fragments and medium quantities of large sherds came from among the stones of 413. Both turf walls were filled with medium quantities of material. Layer 407 was dominated by small to medium-sized bone fragments and a few large sherds whilst 404 produced small bone fragments and a medium quantity of large sherds (Figure 8.12).

Abandonment layers

This group accounts for most of the layers within this phase: 379, 377, 376, 403, 402, 411, midden 341=396, 367=373, 360 and 357. The thin or spatially restricted layers 411, 402 and 403 produced too little material for analysis. All but one of the large assemblages has the same basic fragmentation profile: medium-sized bone fragments with very little medium or small-sized pottery (341=396, 367, 377 and 379). The other large assemblage (357) was dominated by small bone fragments and just a few large sherds. The remaining three fills had medium-sized assemblages. The fill of the niche (373), stratigraphically equivalent to 367, had a slightly different composition with large-sized bone fragments and a large proportion of medium-sized sherds. The other two layers had medium-sized bones with no pottery (360) and with medium quantities of medium-sized sherds (376).

Of all these abandonment fills, only those in 373 and 376, both relatively small assemblages, are likely to have come from inside dwellings. The remainder might have been produced on outdoor surfaces where pottery was rare.

Bone, antler and metal artefacts

Although artefacts were few in this phase, there is an interesting range. Artefacts from the floors are considered in section 8.6, above.

From the pre-construction and midden deposits (Table 8.1) came a complete iron tanged arrowhead, bone artefacts and an iron fitting from layer 398. Layer 394 contained a bone point and two iron objects, as well as the King Cnut penny (SF 1672). None of these came from inside the shed. In windblown sand 408 were two bone objects.

From the cobbled surface (350) came six iron artefacts, mostly nails, the whale bone scutching tool and a cetacean vertebra that might have served a structural purpose (described in Chapter 14).

From the construction deposits, another complete, iron socketed arrowhead came from the turf wall 404 and may constitute a foundation offering. The row of stones 413 produced a polished bone point, and wall 365 incorporated a large piece of whale bone.

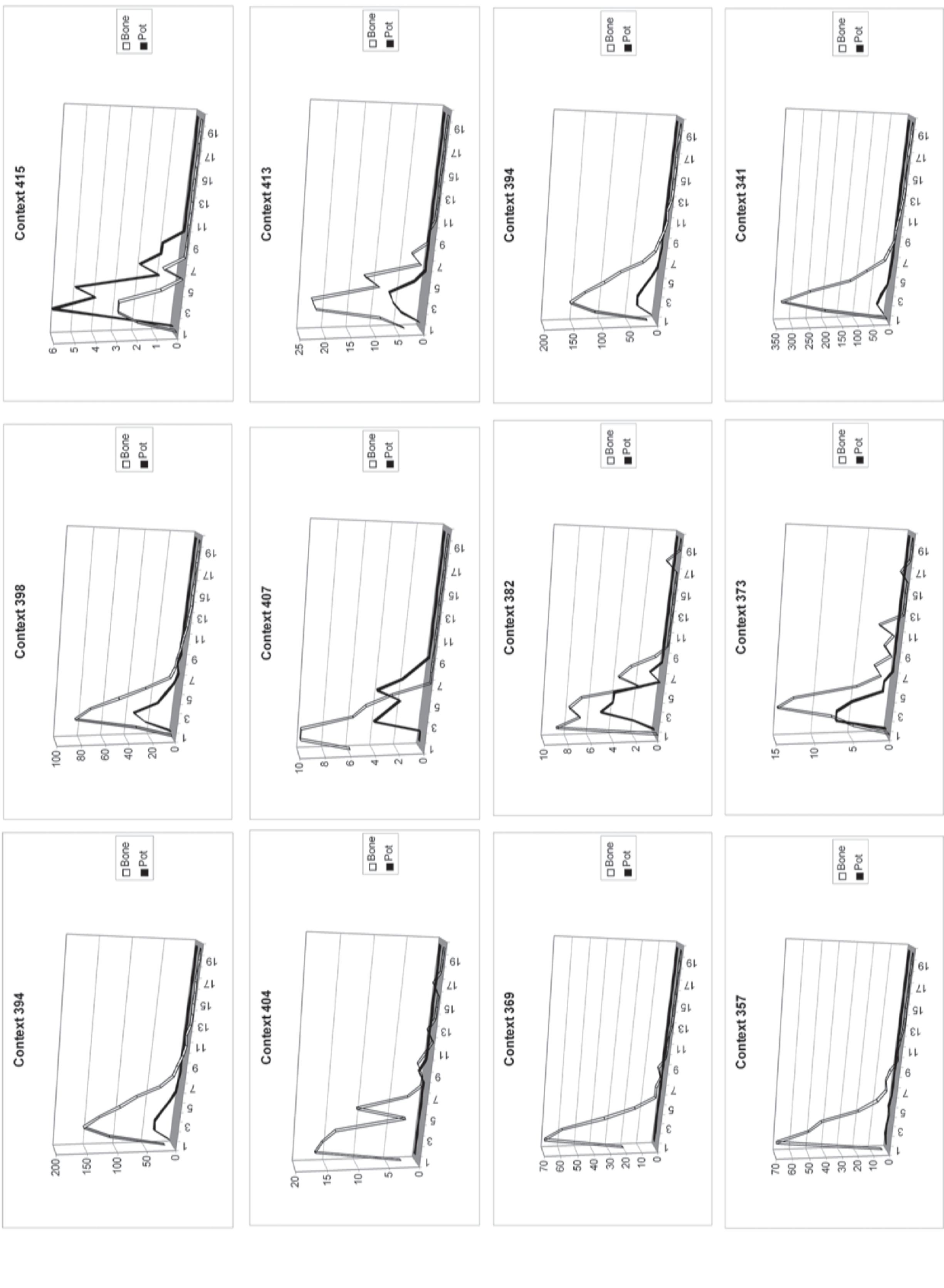


Figure 8.12. The fragmentation of sherds and bones in phase 6 pre-construction layers (394, 398, 415), construction layers (404, 407, 413), floors (369, 382, 394) and abandonment layers (357, 373, 341)

From the abandonment and midden layers (Table 8.1):

- Layer 367, filling Shed 400, produced a comb fragment, pieces of worked antler and worked whale bone, a piece of gneiss used for grinding and 19 iron artefacts.
- From layer 376, filling Shed 406, came a complete iron chisel and a polished beach cobble.
- Midden layer 341 contained a comb fragment, a piece of worked bone that is possibly part of a finely worked cross, bone points and worked whale bone, a polished stone and a few iron artefacts.
- Layer 403, north of the sheds, produced a square-headed bone pin, worked antler and a large piece of whale bone.
- Layer 357 contained a few iron objects, primarily nails,

Iron-smithing slag

A large block and three smaller pieces of slag came from 367, the abandonment fill of Shed 400.

Ceramics

The pottery of phase 6 is dramatically different in some ways to that from phase 5 and before. The sherd thickness (for pots and platters) is greater in the phase 6 assemblage, and vessel forms are predominantly curved rather than convex. A stylistic innovation in phase 6 seems to have been the adoption of platters with out-bevelled rims.

There are also signs that the ceramic vessels were used less intensively than in earlier phases. The percentages of blackened (6.9%), sooted (15.1%) and residue-containing (5.7%) sherds drop to the lowest levels recorded at Cille Pheadair, whilst the percentage of sherds with off-white residue (8.7%) is lower only than that in the pits of phase 1. Equally, although sherds bearing carbonized residues are few, they stand out from other phases because of the thickness and extent of those residues. The conjunction of thicker walled vessels and less evidence of cooking makes it likely that a larger proportion of storage vessels were broken in this phase, supporting the structural interpretation of the sheds as storage buildings.

However, the low proportions of blackened or sooted platter sherds in phase 6 are not explicable in terms of their use as storage vessels. This raises the possibility that much of the ceramic assemblage might have been broken before use or after only a brief period of use. The very high conjoinability of sherds, particularly from the abandonment fills and midden layers (341 and 367 especially), indicates

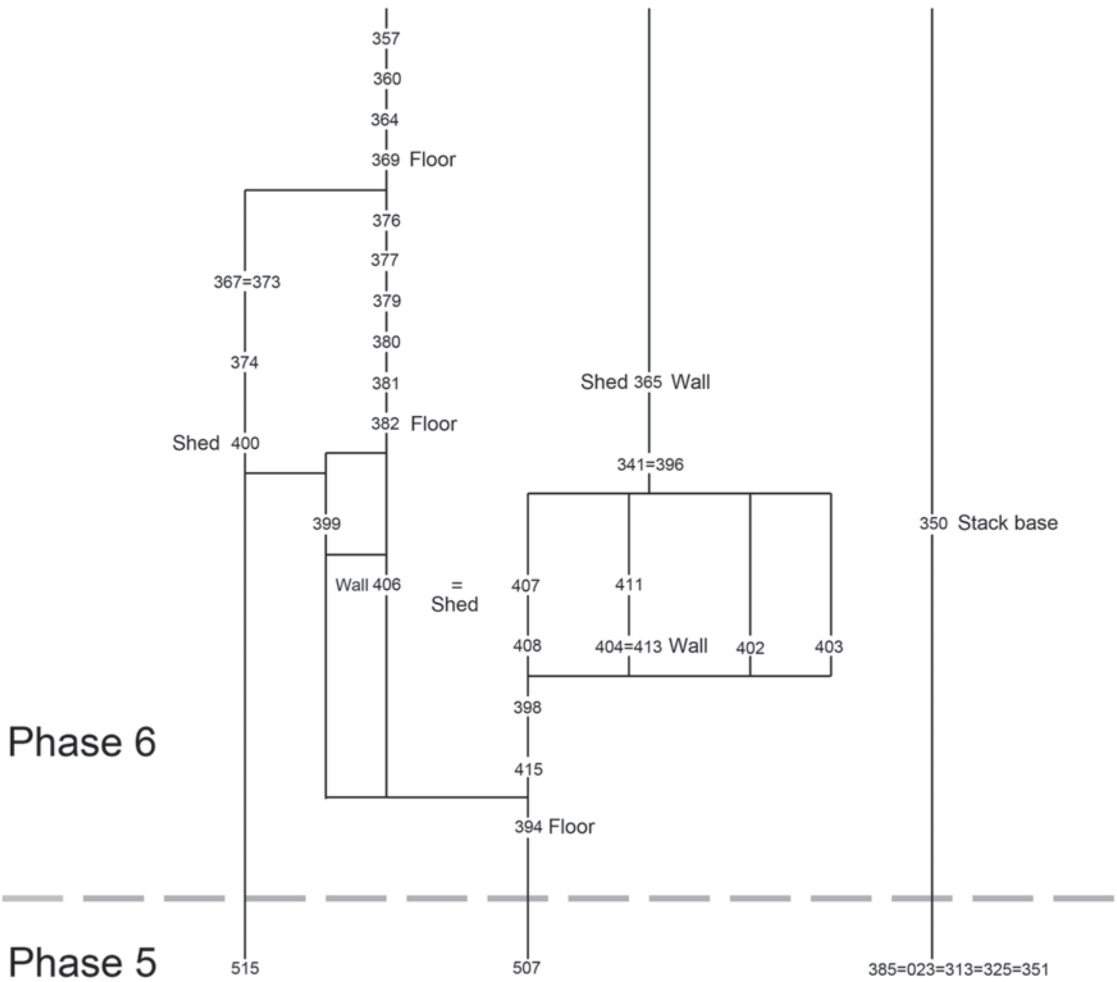


Figure 8.13. Stratigraphic matrix of contexts in phase 6

that many vessels might have been broken in the close vicinity. Specific sherd conjoins between layers (in addition to those mentioned for the floors, see above) were found between turf wall 407 and 408 below it, and between 408 and 394, three layers below.

Breakage patterns show a heavier average sherd weight (10.5g) than at any time since phase 2. The shortage of well-trampled interior surfaces no doubt partly accounts for this. One of the mysteries of this phase is that a small but nonetheless significant proportion of the vessels had been used for cooking and yet there is not a single hearth. The pots might have been brought from another farm mound, either whole and containing ready-cooked food or in pieces as refuse for throwing away. Alternatively, we cannot rule out the possibility of a dwelling with a hearth, on the west side of the mound, having been washed away by the sea prior to the excavation.

Platter ware

Interestingly, platter ware sherds form a much lower than average proportion of the sherds in the sheds' floor layers, even though so much platter ware was placed in Shed 400's niche (fill 373). Platter is common from phase 4 onwards so its general absence from the sheds suggests that the non-platter ceramics brought here contained pre-prepared food such as stew: the baking products from platter cooking could have been brought by hand without need of the platter itself.

Dog coprolites

The sand fill (367, 373) of Shed 400 and its niche, contained coprolites, as did Shed 406's fill layer 377 and layer 341, a shelly layer below Shed 365. Coprolites were also found on the floor 369 of Shed 365, the final structure in phase 6, and layer 357 in the top of Shed 365.

Mammal and fish bones

J. Mulville and C. Ingrem

The smaller assemblage of mammal bone from the sheds and middens of phase 6 (NISP = 979) reverses the rise in the proportion of cattle seen in the previous phase; sheep/goat are again dominant and pig greatly decreases. Other domestic species present are dog, cat and horse. Red deer and seal (one tooth only) are the only wild species present.

A total of 1,148 identifiable fish bone fragments was examined from the >10mm material dated to phase 6 and a further 44 fragments <10mm in size (total n=1,192). The proportion of both cod (29%) and pollack (7%) in the >10mm material is lower than in phases 3, 4 and 5 although, overall, the assemblage is still dominated by gadoid fish. Herring continue to dominate the <10mm material in this small sample. Fragments belonging to bull rout, flounder and wrasse are also present.

Wood charcoal

P. Austin

Heather was the most ubiquitous of the seven taxa identified, followed by Pine, Birch, Willow/Poplar and Oak, Hazel and *Prunus* sp. Samples from the floor of each shed (400 and 406) contained approximately the same taxa, in more or less the same ratio as is seen in hearth deposits from other phases, suggesting that the floor remains may be the scattered debris from a hearth. This is interesting because no hearths were present in the sheds.

8.10 Overview

M. Parker Pearson

Sheds 400 and 406 were constructed within the period of *cal AD 1100–1155* (*95% probability*) and probably *cal AD 1100–1145* (*68% probability*). There is no indication of the date when they were dismantled prior to the construction of House 312 (phase 7) except that this next longhouse was built sometime after *cal AD 1105–1160* (*95% probability*). The worn silver quatrefoil penny of King Cnut, minted in York around AD 1017–1023, was deposited shortly before the sheds were built; it was probably already about a hundred years old by this point.

After the two sheds went out of use, a poorly built wall (365) was constructed on top of them, presumably forming one side of a third and final shed. The only other structure excavated was a spread of burnt cobbles that might have formed an outdoor working surface, or possibly the base of a haystack, or both (Figure 8.12).

The construction of these small sheds suggests that the farm mound was temporarily unoccupied and used only sporadically, for agricultural activities and storage, during this phase. However, the scattered charcoal from the shed floors and the wood ash revealed by soil micromorphology of a shed floor suggest the possible proximity of a hearth; such a feature might have been destroyed within those parts of the sheds cut by the sunken-floored pit in which House 312 was later built.

Animal bones continued to be deposited in quantity during phase 6, but the pottery shows differences in character and composition to that from earlier phases of the farmstead. It may be that most of the pots in this phase were used for storage rather than cooking, emphasizing the primary use of the site at this time for purposes not directly associated with dwelling within a house.

Analysis of the shed floors has not revealed any interesting patterns of use. Finds on these floors were scarce but include two flint strike-a-lights, a lump of potting clay, a whale bone artefact, some nails and a whetstone. Just two fragments of combs came from the phase 6 contexts. Among the unusual finds are the two complete iron arrowheads, a complete iron chisel, and various worked whale bone objects, including a whale bone scutching tool.

9 The east–west longhouse: House 312 (phase 7), constructed *cal AD 1105–1160*

M. Parker Pearson and M. Brennand
with contributions by H. Smith, H. Manley, P. Marshall, C. Ellis, J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

9.1 The house and its deposits

M. Parker Pearson and M. Brennand

After a period of activity that seems not to have involved dwelling on the site (phase 6), the farm mound was reoccupied in phase 7 with the construction of a new longhouse (House 312) and a semi-detached outhouse (006; Figure 9.1). In contrast to earlier longhouses at Cille Pheadair, the new building was given an east–west axis. This change in direction had been first initiated in phase 6 with the arrangement of the sheds, which lie east–west across the earlier House 500. The new outhouse (006) was a square building located against the west end of the south wall of House 312, so closely that it probably shared the turf wall of the longhouse as its north wall. The only other locus of activity in this phase was the northern midden, where rubbish layers were deposited. A north–south gully and a cobbled surface were also constructed in this area (Figure 9.2).

Construction

The walls of House 312 were inserted into an east–west rectangular construction cut (363=221, filled with 359 and 388) to form a sunken-floored longhouse. To the north, the construction cut truncated the light grey-brown sand (357) covering the phase 6 Shed 365, and to the east it truncated the phase 5 midden-retaining wall (119). The construction cut destroyed the southern edges of the sheds from phase 6 (see Chapter 8; Figures 3.2, 9.1, 9.3); it also cut down to the top of phase 5 floor layers in House 500, and into part of the phase 3 sandbank extension (528).

The dimensions of the longhouse are, curiously, almost exactly the same as those of House 700 in phase 3. This may indicate the use of a system of measurement and proportion for laying out the ground plan. Nine yards by four yards and a foot (*i.e.* 27ft × 13ft) might have been the desired dimensions. The corners of House 312 are slightly more rounded than those of the earlier longhouses (or of the subsequent House 007 in phase 8) and may be a product of changing architectural fashions. During excavation we noticed that the long walls created an optical illusion of being curved or boat-shaped (Figure 9.4).

A further interesting observation concerns the reuse of walls of earlier houses. Although the shed walls of the preceding phase 6 were slighted, House 312 was located so that the western end of its long south wall lay directly on top of the short south wall of House 500 (Figure 9.1). This could be dismissed as fortuitous except that similar founding of new walls upon certain stretches of old walls occurred with Houses 700 and 500 (see Chapter 6 and compare Figures 5.2 and 6.3) and, later on, with Houses 312 and 007 (see Chapter 10). Whether the ancestral link between the occupants of Houses 312 and 500 was real or constructed cannot be known but the builders of House 312 were at pains to assert an architectural relationship with the dwelling that previously stood on the site.

A layer of mixed grey sand (209) was laid on the surface of the rectangular pit within which the house was to be built, preceding both the walls of House 312 and the earliest floor layers (Figure 3.2). This sand contained large quantities of green slate, similar to the quantities found in the wall fills (530 and 547) of House 500 in phase 5. A carbonized residue from layer 209 produced a radiocarbon date of cal AD 970–1160 at 95% probability (SUERC-4877; 995±40 BP).

House 312 was 8.20m long, 4.00m wide at the centre and 3.20m to 3.40m wide at its ends. The walls were constructed of unworked beach stones in random unbonded courses, surviving from two to five courses in height. The single entrance, towards the eastern end of the north wall, had been badly truncated by the subsequent construction of

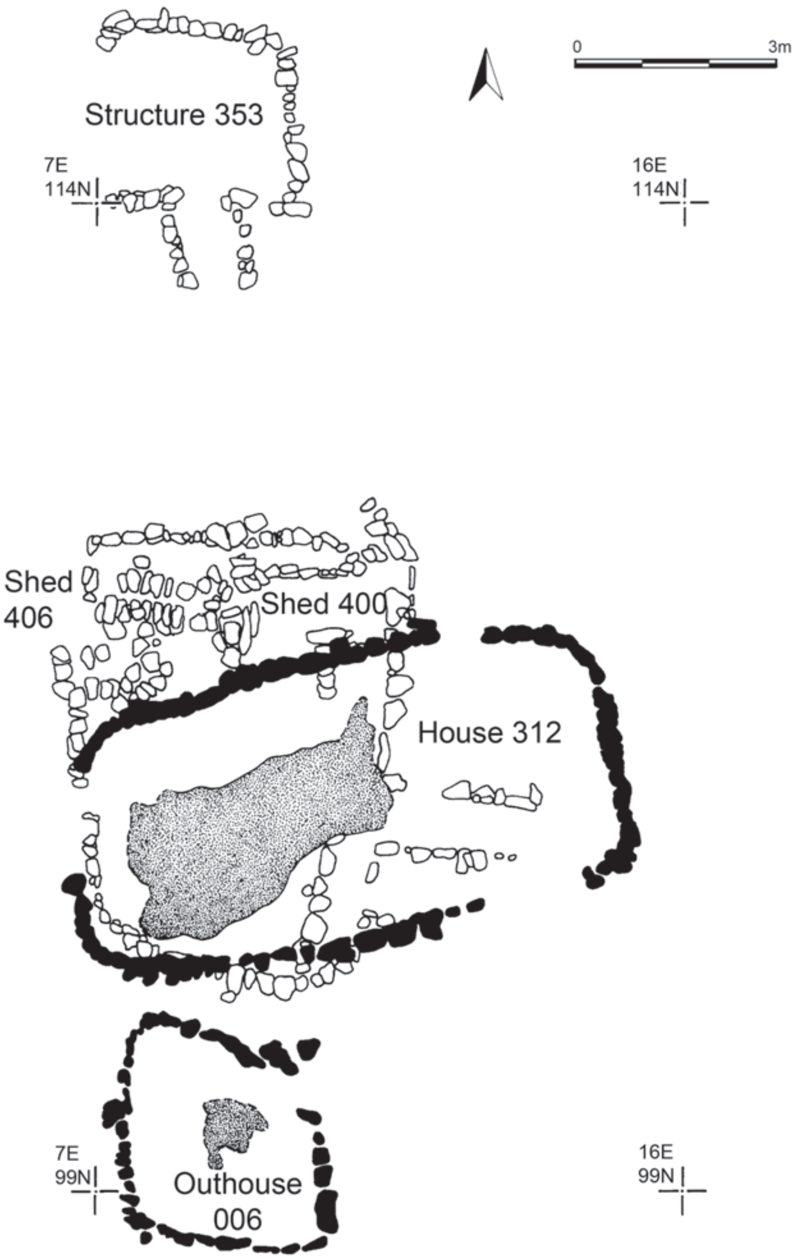


Figure 9.1. Simplified plan of House 312 and features in phase 7, shown as an overlay to the phase 6 sheds and phase 5 walls of House 500

House 007 (in phase 8) and was visible only as a break in the wall line with a spread of passage-floor deposits (204, 217 and 378) and a stone socket-hole probably marking a threshold.

The hearth

The central hearth (205) was the earliest deposit on the house's floor (the floor comprising contexts 205, 206 and 214). This survived as a multi-lensed deposit (205), up to 0.20m deep, of orange, brown and black organic sand and peat ash, with shell, bone and flint inclusions, possibly set within a shallow fire-pit. Not contained within any formal stone setting, the hearth ran down the centre of the western end of the house and measured 4.20m east–west by 2.10m north–south (Figures 9.1, 9.5–9.6). It was formed by multiple episodes of burning within the centre of the house, with the ash scatter being trampled and spread around its edges. The intensity of the bone and shell concentrations in the western part of the hearth, especially of fish bone, suggests that this western end and its environs were used primarily for cooking.

The assemblage of artefacts (Table 9.1) from the lower hearth and floor layers (205, 206 and 214) includes a finely executed copper-alloy spiral terminal, part of a bone pin, a large paddle or beater made from cetacean bone, pieces of worked cetacean bone and worked antler, struck flints and worked stone, and a number of iron objects including

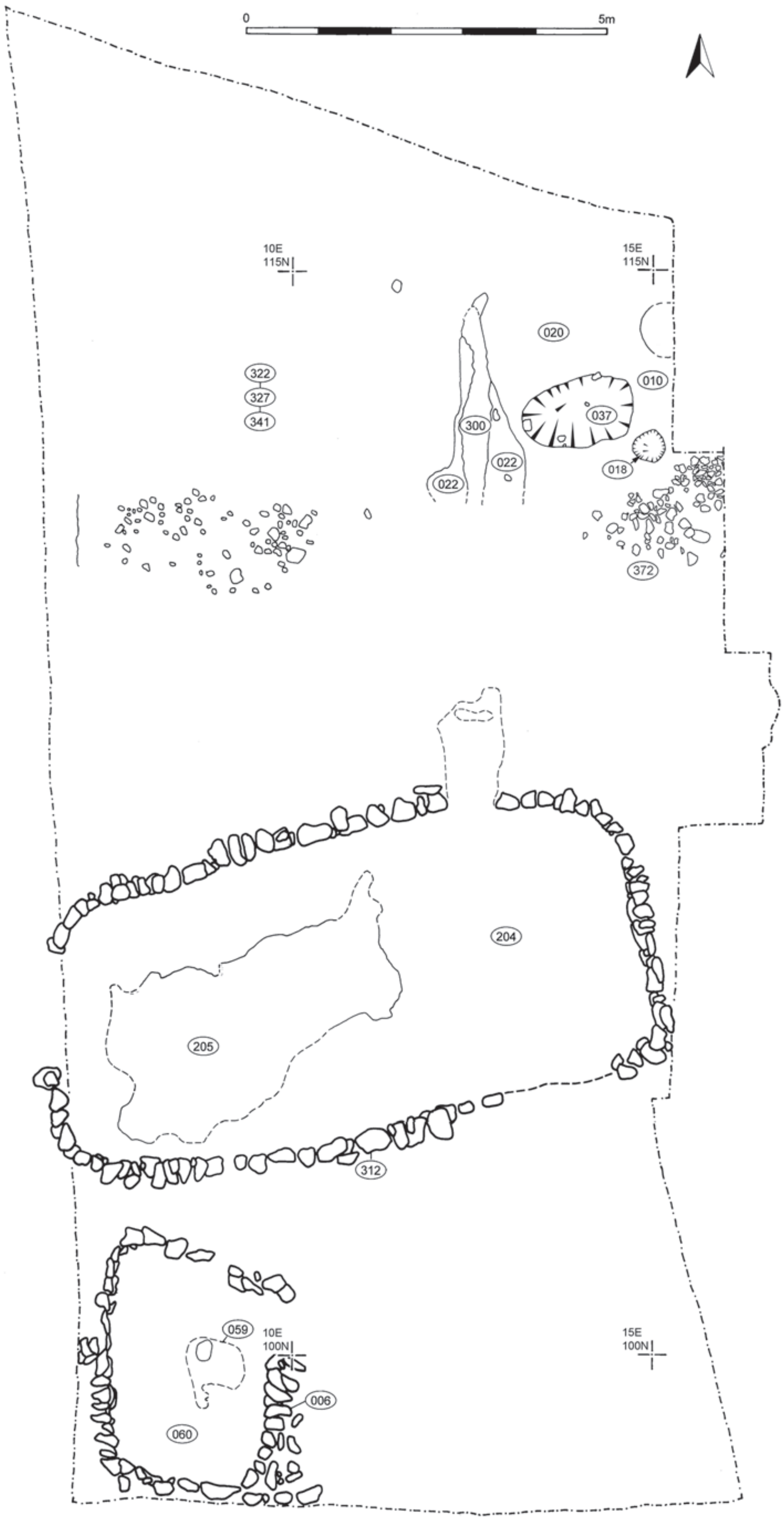


Figure 9.2. Plan of phase 7 structures and features

Figure 9.3. House 312 during excavation, showing its relationship to the sheds of phase 6, viewed from the southeast

Figure 9.4. House 312 during excavation, showing the slight bowing of the north wall and the stones overlying floor layer 204, viewed from the east

two small knives, the tooth of a wool comb or flax heckle and a needle.

The hearth layer also contained a significant scatter of small, rounded white and green pebbles. The uniformity and colour of the pebbles suggest that they were deliberately selected to be brought onto the site; they might have come from the east coast of the island (where there are outcrops of quartz and green slate). We interpret them as either crude gaming counters or as decoration for the house interior (see Chapter 16).

The floors

The hearth's southern edge overlapped a limited floor layer (214) in the southwest corner of the house (Figures 9.6–9.7). Parts of these were then both covered by layer 206,

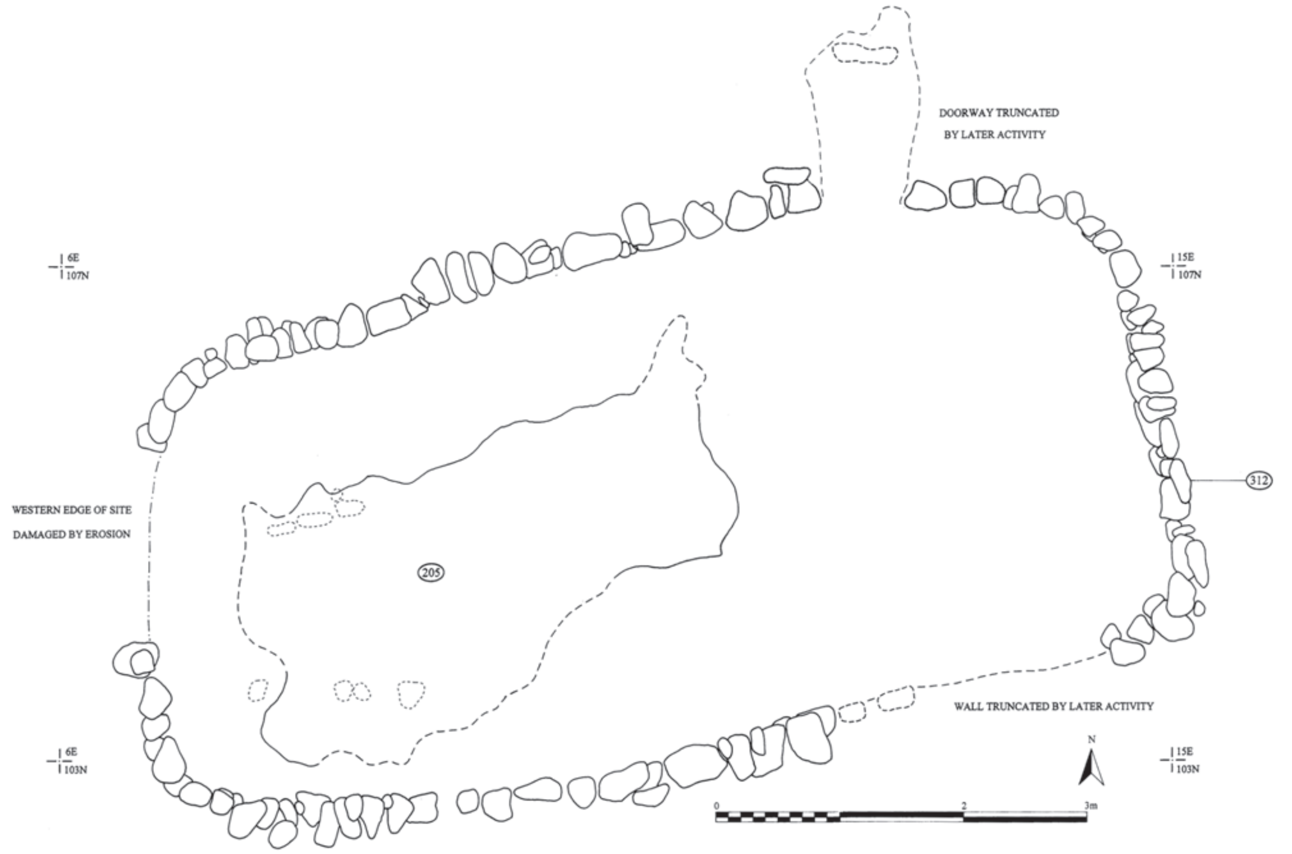


Figure 9.5. Plan of House 312 and its doorway, with hearth deposit 205 and underlying stones

larger than hearth 205 and running down the centre of the building (Figures 9.6, 9.8). Finally, the whole house interior was covered by floor layer 204 (Figure 9.9), separated from 206 in the northwest by a lens of windblown sand (218). Within the doorway, layer 217 was similar to floor 204; it covered a lighter grey entrance floor layer (378) which was initially visible around layer 217's edges.

The stratigraphic sequence is confirmed by the soil micromorphological analysis which reveals that the final deposit (204) covering most of the floor was one that accumulated during a period of abandonment when the floor became covered in faecal material (see below). Thus the artefacts within layers 204 and 217 accumulated during final occupation and abandonment whereas those in layers 205, 206, 214 and probably 378 were incorporated into the floor deposits during the house's earlier inhabitation. The 'empty' zones in these floor layers (where artefacts were largely absent around the long sides and the east end of the house) indicate zones where dropped material did not accumulate, presumably because of the presence of wooden fittings such as beds and screens.

The grey sand deposit (214) in the southwest corner of the house, contained shell and animal bone, and various artefacts, including a finely executed transversely flattened-head bone pin, a hone and a socketed iron awl (Table 9.1)

The sand layer (214) stretched from the south wall to the northern edge of the hearth (205) at its western end. Cut through the top of 205 and later than 214 was a pit or large posthole (215), filled by a brown sand (216) with evidence of packing (Figures 9.10–9.11). If this was a structural post, it presumably belonged to a late phase within the house when this part of the hearth at least had gone out of use.

South of the hearth (205) there were a posthole (208) and two stakeholes (211 and 213; Figures 9.10–9.11). These might well have been contemporary with the hearth since floor layers in the Cille Pheadair houses often masked the tops of posthole fills.

Layer 206 was a surface of mid-orange/brown to black organic sand, thought to be an occupation deposit of trampled hearth ash and peat mixed with sand. It did not reach up to any of the walls, but ran down the centre of the house in a wide strip extending northwards to the entrance at the eastern end. The formation of this deposit after the main accumulation of the hearth (205) suggests that it represents use of the house prior to its final inhabitation and abandonment, whilst the roof remained intact and before the formation of floor 204, and before the house was filled with deep layers of windblown sand (201, 202, 203 and 200).

Final inhabitation and abandonment

The final 'floor' deposit (204) within House 312 was separated from 206 in the northwestern part of the house by a layer of clean white sand (218) that might have blown in during roof repairs and not been cleaned out. Layer 204 was an extensive spread of mid- to dark brown compact

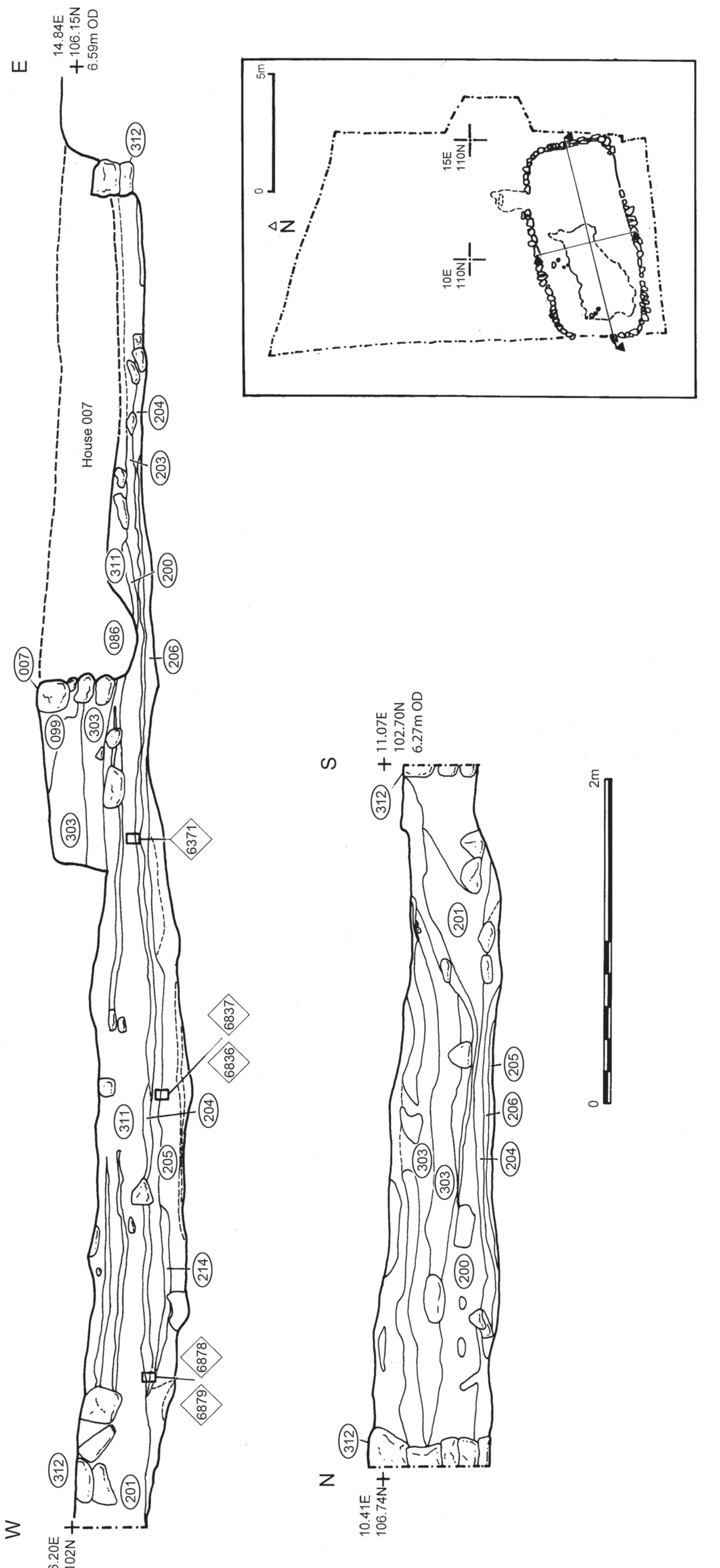


Figure 9.6. Sections through the floors and abandonment fills of House 312

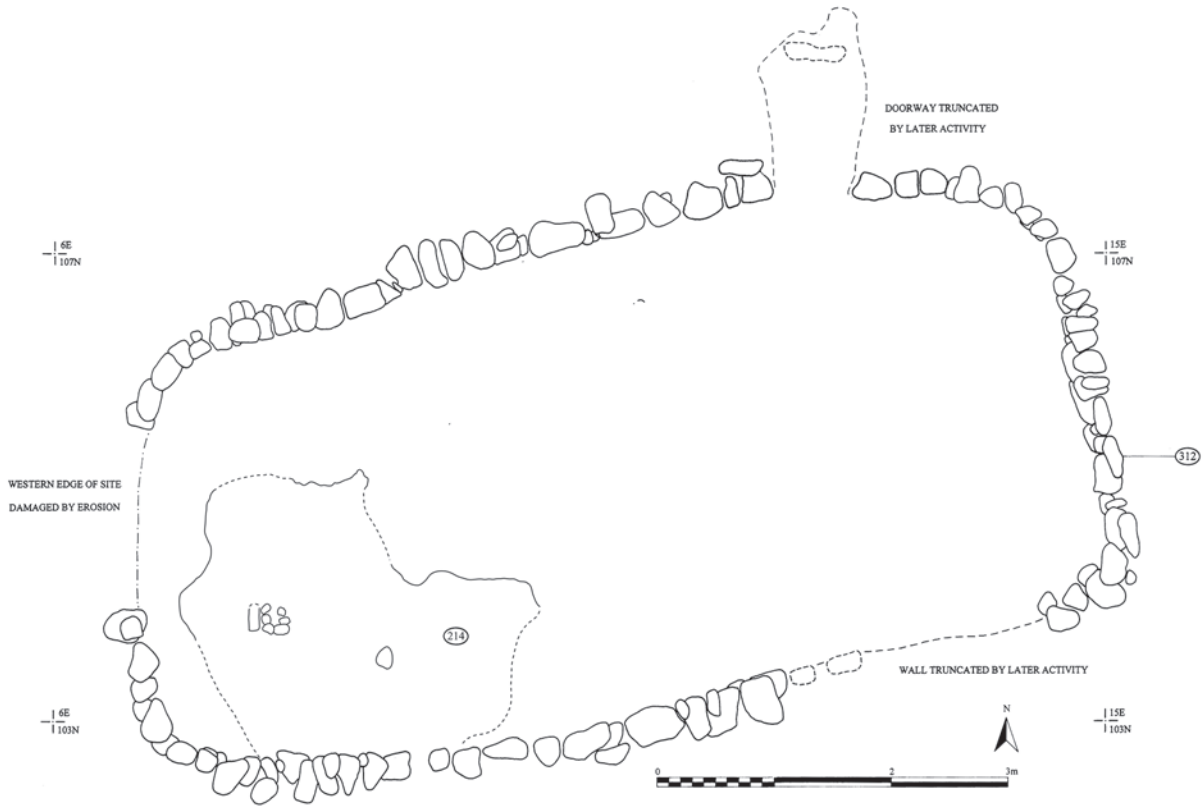


Figure 9.7. Plan of House 312 with floor 214

sand, stretching across the hearth and the centre of the house and extending to the north and east walls, but not quite reaching the west wall or the western end of the south wall. (It may be the same as layer 068, found below the northwestern quadrant of House 007 where it cuts the upper fills of House 312's east end; see Figure 10.2.)

Layer 204 was littered with stones that ran roughly parallel to the walls (Figures 9.4, 9.9). Almost all of these were found to overlie floor 204 and had probably tumbled from the upper walls of the abandoned house. In the northeast corner of layer 204, close to the doorway, was a large fragment of platter ware.

The floor 204 also contained a number of unusual artefacts, including a cross pendant of polished bone, a complete bone pin, a bone pin-beater, a rare bone saw-bow and an iron crozier-shaped terminal (Table 9.1)

Floor layer 204 was covered by a series of windblown sands that completely filled up the house interior. The earliest of these (201, 202, 203) accumulated in different parts of the house, and were succeeded by a mixed and mottled layer (200) that filled the house. This was largely removed in the house's east end when the subsequent longhouse, House 007, was built (Figure 9.6). Layer 200 contained four articulating cattle vertebrae (SF 1246) radiocarbon-dated to cal AD 1030–1250 at 95% probability (SUERC-4872; 880±35 BP). Artefacts from layer 200 include a broken ceramic platter (SF 1244), a decorated bone mount (probably from the same wooden box as another fragment from a phase 5 abandonment layer), a broken bone needle and a green slate plate or pot-lid (Table 9.1)

Layer 200 was covered by a windblown yellow sand (311; Figure 9.12) and the final fill on top of this was a windblown cream-coloured sand (303; Figure 9.6).

9.2 Outhouse 006 and its deposits

M. Parker Pearson and M. Brennand

This small, trapezoidal sunken-floored building, internally 2.75m east–west and 3.24m north–south, lay to the south of House 312's west end (Figures 9.1–9.2, 9.13).

Construction

There were no certain doorway posts evident for Outhouse 006's earliest stage (Stage I) but the doorway could be identified as a 0.46m-wide gap at the north end of the east wall (Figure 9.14). Immediately within the east-facing doorway was a reused threshold stone (SF 1061), its upper surface worn from use. The walls (006) of this outhouse were packed within a cut (102) into the top of the phase 2 sandbank enclosure wall, which was completely buried by this period.

It was not possible to link Outhouse 006 stratigraphically with either House 312 or the subsequent longhouse (House 007), but its earliest features and floor probably belong to phase 7 because of Outhouse 006's spatial relationship to

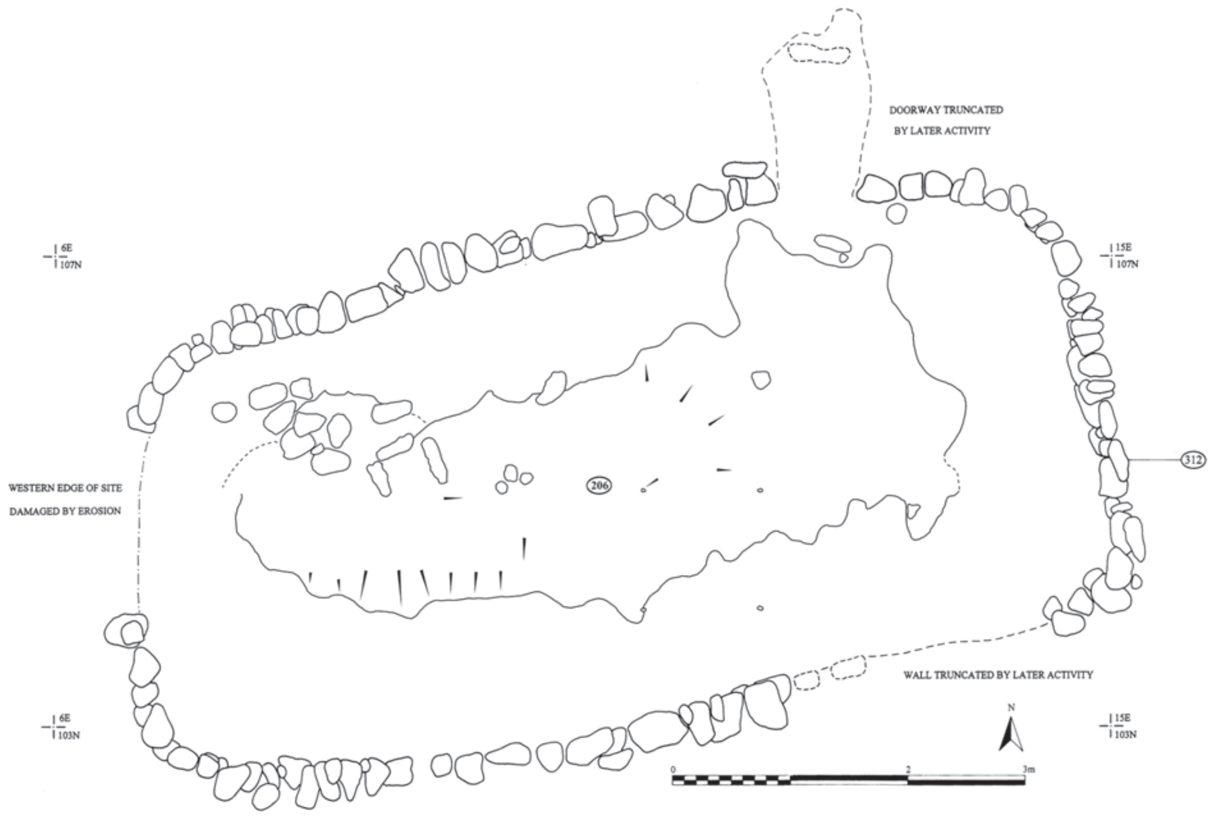


Figure 9.8. Plan of House 312 with floor 206

House 312 (it is likely to have shared a since-vanished party wall of turf with House 312) and because of the similar heights of the wall footings of both structures. The gap between the stone walls of Outhouse 006 and House 312 is about 1.20m by the east-facing outhouse doorway, narrowing to 0.50m at the rear. This would allow for a turf wall that must have once surrounded House 312, and extended in an L-shape to incorporate Outhouse 006.

The floor

The earliest outhouse floor (Stage I; Figures 9.14–9.15) was a light brown sand (060) on which was set a small, ephemeral central hearth (059), in the centre of which lay smashed ceramic platter fragments (SFs 1119, 1120, 1121). Directly on top of hearth 059 was a second more conspicuous hearth (083). This second stage of occupation might have been associated with a modification of the east wall, in which it was moved further inwards (Stage II). However, there is no stratigraphic evidence to link the two events, which might not have been simultaneous.

The third, fourth and fifth stages of Outhouse 006 are considered to be associated with House 007 in phase 8 (see Chapter 10), as the doorway was then repositioned to face north towards the pathway that leads towards Outhouse 006 from the west doorway of House 007 (see Figures 10.1–10.2).

9.3 The spatial patterning of debris within the house and outhouse floors

M. Parker Pearson, H. Smith, H. Manley and P. Marshall

The hearth (205) and floors 206 and 214 contain the earlier material deposited within House 312, whilst 204 accumulated when the house was in its final stages of use and abandonment.

With the door at the east end of its long north side, this house's floor distributions can be compared directly to distributions in the floors of the preceding houses of phases 3, 4 and 5 (Houses 700 and 500) when one understands that House 312 differs only by being rotated anti-clockwise by 90°: that is, House 312 has its longer sides to the north and south. If we adopt the heuristic device that the reader is sitting against the (short) west wall of House 312 and looking east towards the far, east wall and doorway, then we can describe the different parts of the house in terms of left and right, far and near. This allows direct comparison with Houses 700 and 500.

Ceramics

More sherds were found in the lower floor of House 312 (205, 206 and 214) than in the floor of House 700 but fewer than in House 500. The pattern is superficially similar,

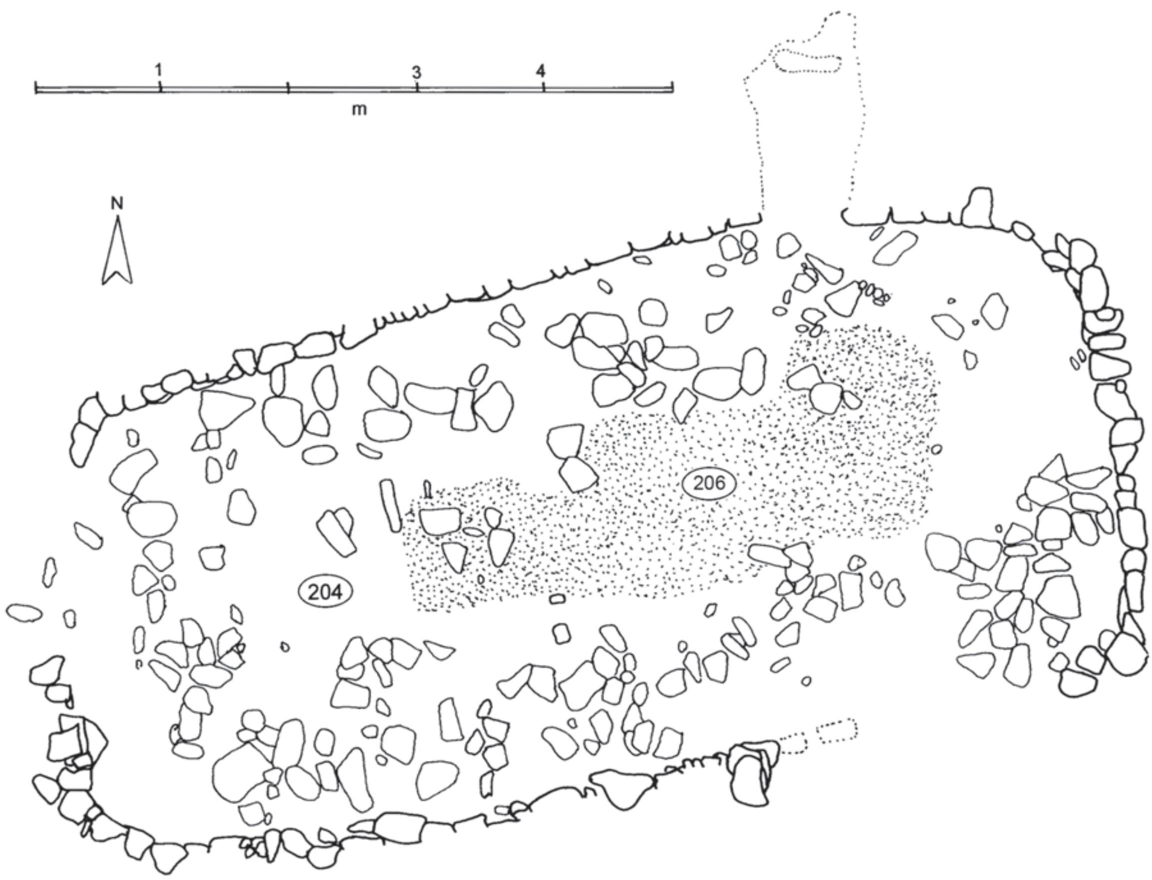


Figure 9.9. Plan of House 312 on abandonment, showing the final floor layers 204 and 206

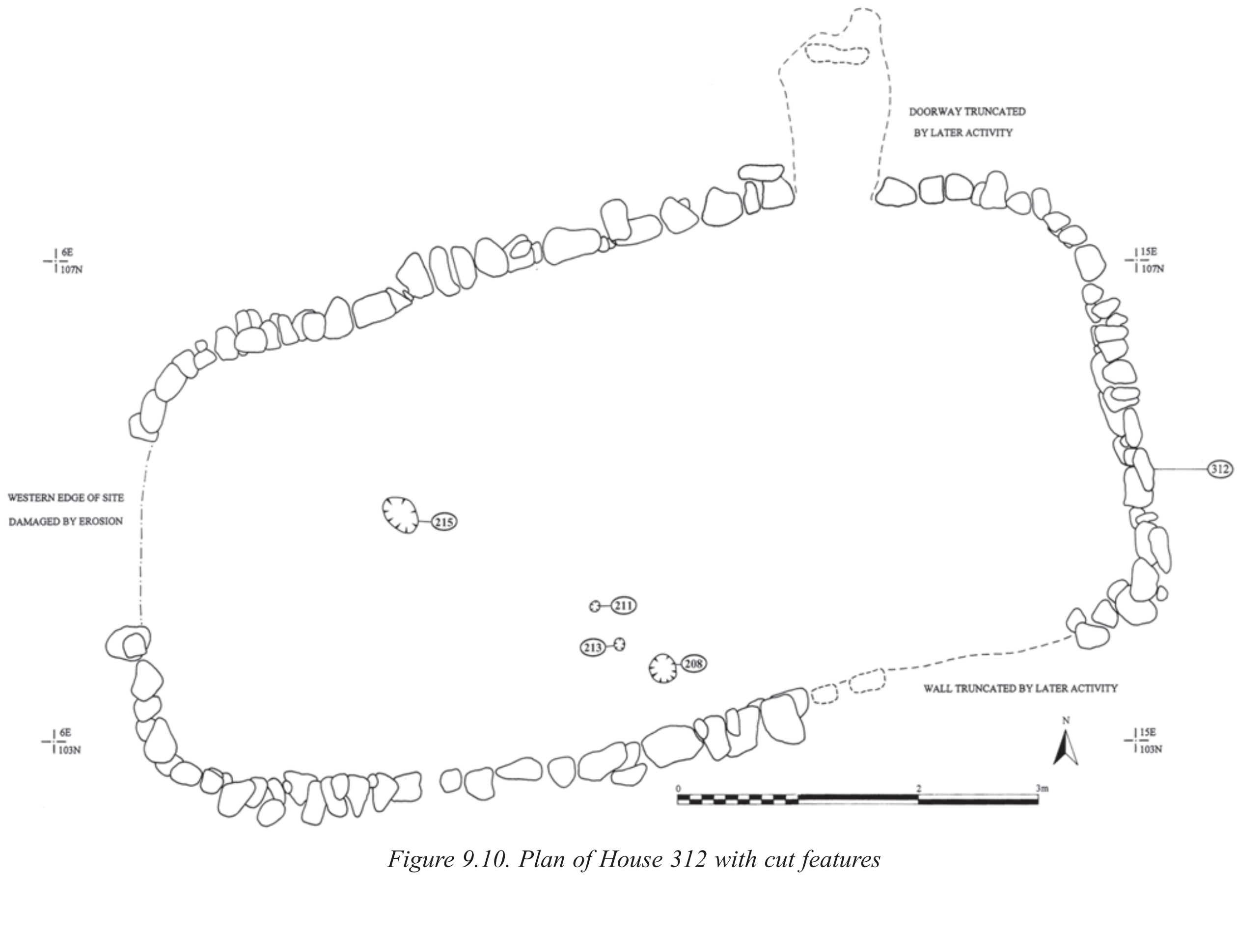


Figure 9.10. Plan of House 312 with cut features

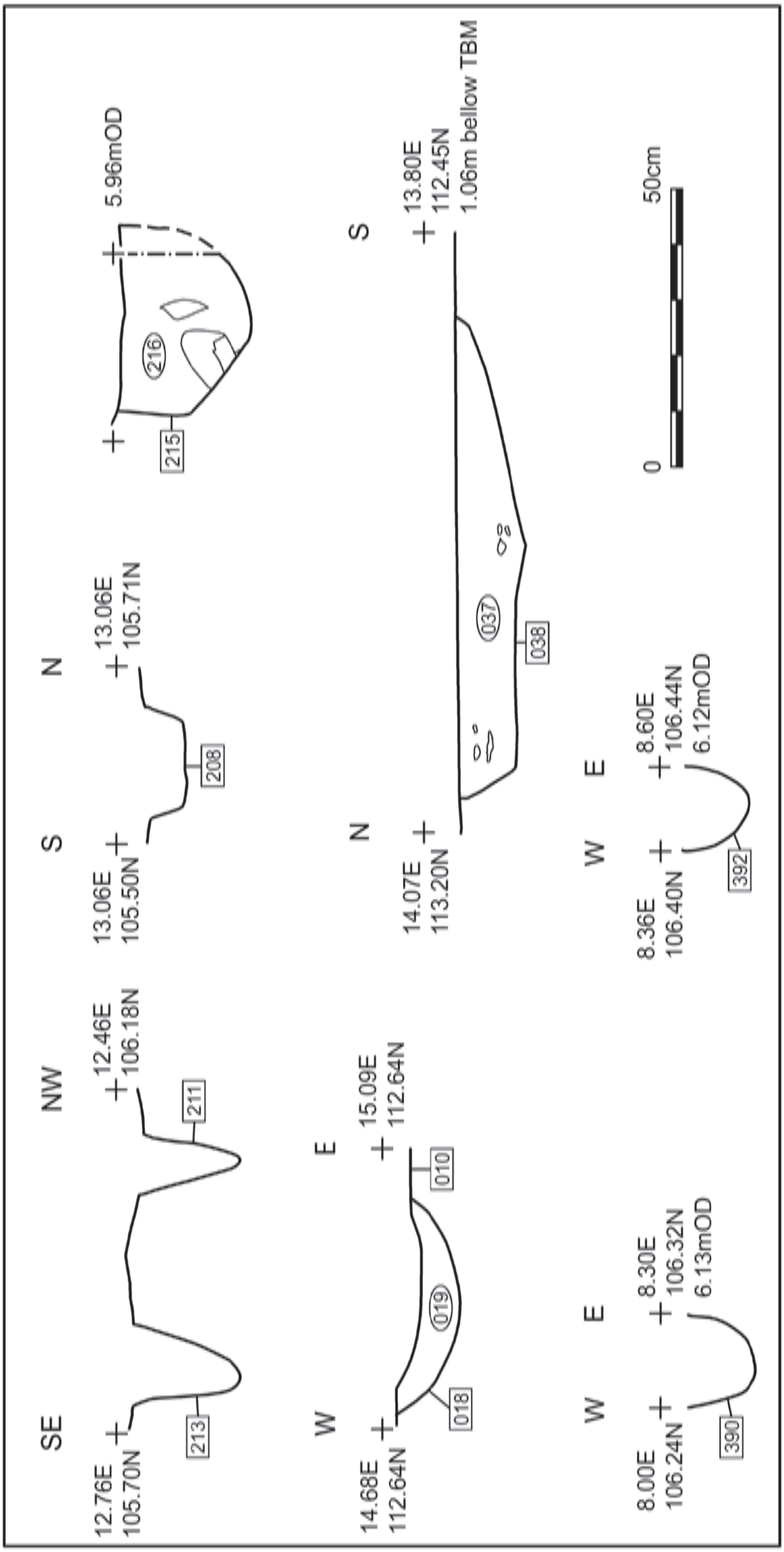


Figure 9.11. Sections of cut features within House 312

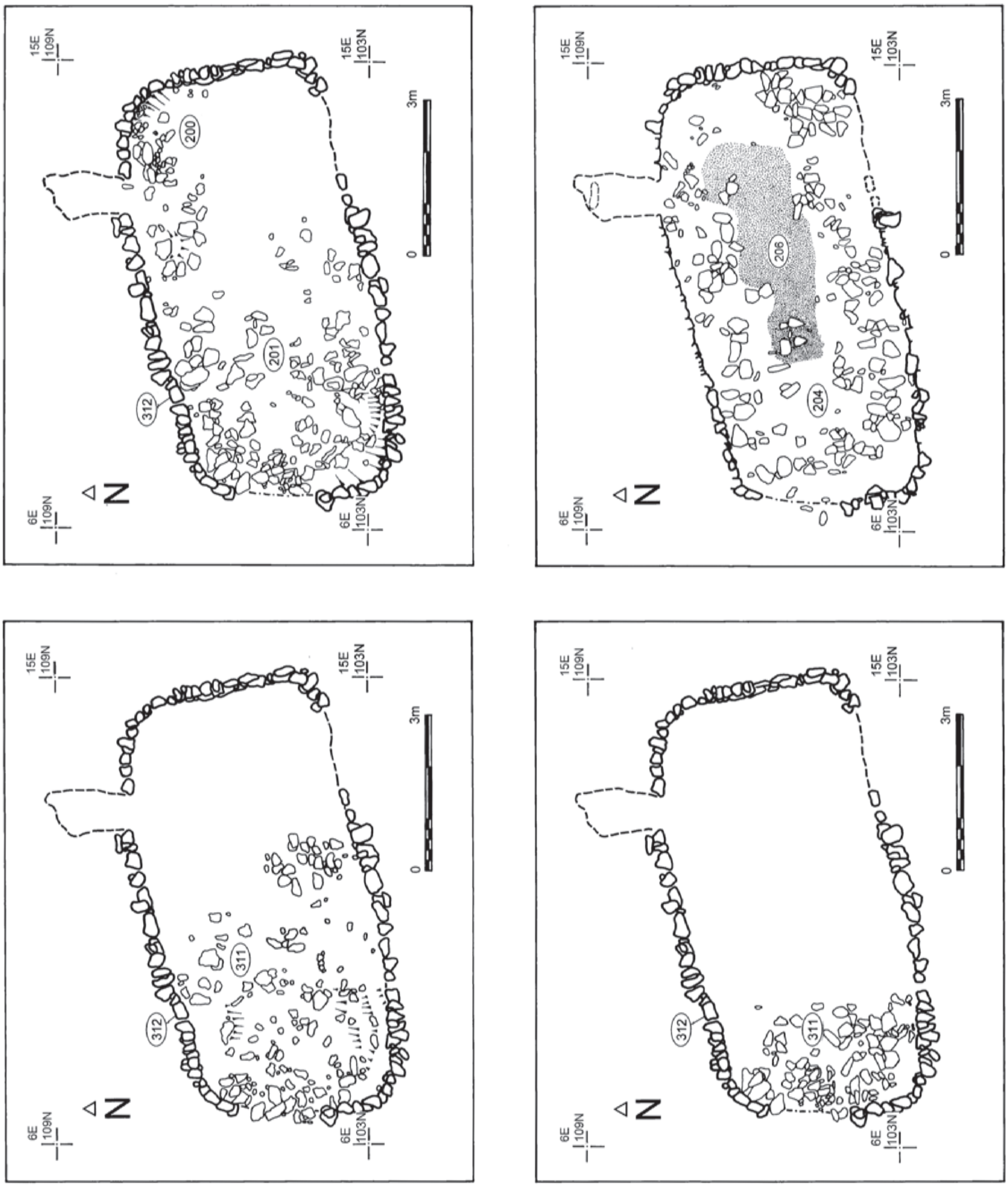


Figure 9.12. The sequence of rubble infill within House 312, from bottom right to top right to top left to bottom left (where the east end is blank because House 007 was inserted there)

Table 9.1. Phase 7 non-ceramic artefacts by context from construction contexts and floors

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 7				
construction fill	388	see Chap 15	iron nail	
construction fill	359	see Chap 15	lozenge-shaped iron arrowhead, clench nail, rove	
construction	209	1594	decorated bone pin	13.13
		2478	bone needle fragment	
		2477	bone point or awl	
		1741	broken hone	16.3
		see Chap 15	iron gouge, clench nails, roves, nails, fitting, strip	
hearth	205	1481	bone pin fragment	
		1521	copper-alloy spiral terminal	13.15, 13.21
		1445	worked antler tine	
		1469	worked antler tine	
		1586	paddle-shaped whale bone beater	14.7
		2340	cetacean bone artefact (plaque, handle, clamp?) fragment	14.9
		2757	whale bone peg or strip fragment	
		1519	stropping stone	
		2535	stone polisher	16.2
		2536	stone rubber or grinder	
		see Chap 15	two iron knives, tooth of wool comb or heckle, needle, rove, nails, strip	
floor	206	2791	bone pin fragment	
		2696	bone spindle whorl	14.1
		1443	worked antler beam	
		see Chap 15	iron nails, unident fragments	
floor	214	1456	bone pin fragment	
		1463	transversely flattened-head bone pin	13.13
		1461	bone point, tip broken	
		1468	bone point	
		1452	worked antler tine	
		2693	polished quartz pebble	16.2
		2534	hone	16.3
		see Chap 15	iron awl, nail, unident fragment	
floor	204	1512	bone pin	13.13
		1787	polished bone cross pendant	13.14
		1563	iron spiral terminal	13.16
		1430	bone pin-beater	14.2
		1267	bone saw-bow	14.2
		2680	bone point	
		2753	antler wedge	
		2755	worked antler	
		2756	worked whale bone	
		1431	hone	16.3
		see Chap 15	iron clench nail, roves, nails, plate fragments, unident fragment	

Table 9.1. continued

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 7				
outhouse	060	1303	comb tooth	
		1274	socketed bone point	14.2
		2798	bone point fragment	
		1250	worked antler tine	
		1061	worn gneiss threshold stone	16.1
		see Chap 15	iron needle, nail	

Figure 9.13. The earliest construction phase of Outhouse 006, after removal of its earliest floor and hearth, viewed from the northwest

with sherds >10mm (Figure 9.16) concentrated in the half of House 312 away from the door (the west or near half). Yet there are differences at a smaller scale. Whereas the main concentration of sherds in the earlier longhouses had been at the end of the hearth furthest from the doorway and to the left-hand side of this spot, in House 312 sherds <10mm and platter sherds (Figure 9.16) were found in two concentrations either side of the centre of the hearth.

In layer 204 there was a low concentration of sherds >10mm at this near (west) end of the hearth but small sherds <10mm were concentrated near the doorway (Figure 9.18). This second 'hot spot' by the doorway, found in the earlier longhouses, was probably formed by refuse accumulating near the exit as a result of sweeping.

Platter ware

Platter ware was at its most common (44% of all sherds) in phase 7 and yet it formed only 24% of the longhouse's floor assemblage. Its distribution in layer 205, at the near (west) end of the hearth, broadly matches that of the other pottery (Figure 9.16). However, its greatest density within this layer was just beyond (east of) the highest sherd concentration at the hearth's near end. This suggests that it was fragmenting in a different, more central part of the hearth to most of the ordinary pots, perhaps as a result of its being used in the further, hotter parts of the fire.

The high numbers of platter sherds on the right-hand (south central) side of the hearth suggest either that platters were introduced onto the hearth from this side or that their sherds were raked out from this position. This concentration on the south side of hearth 205 is reinforced by the few sherds from layer 214.

In layer 204 most of the platter sherds lay against the far (east) wall, with others in the west end of the hearth

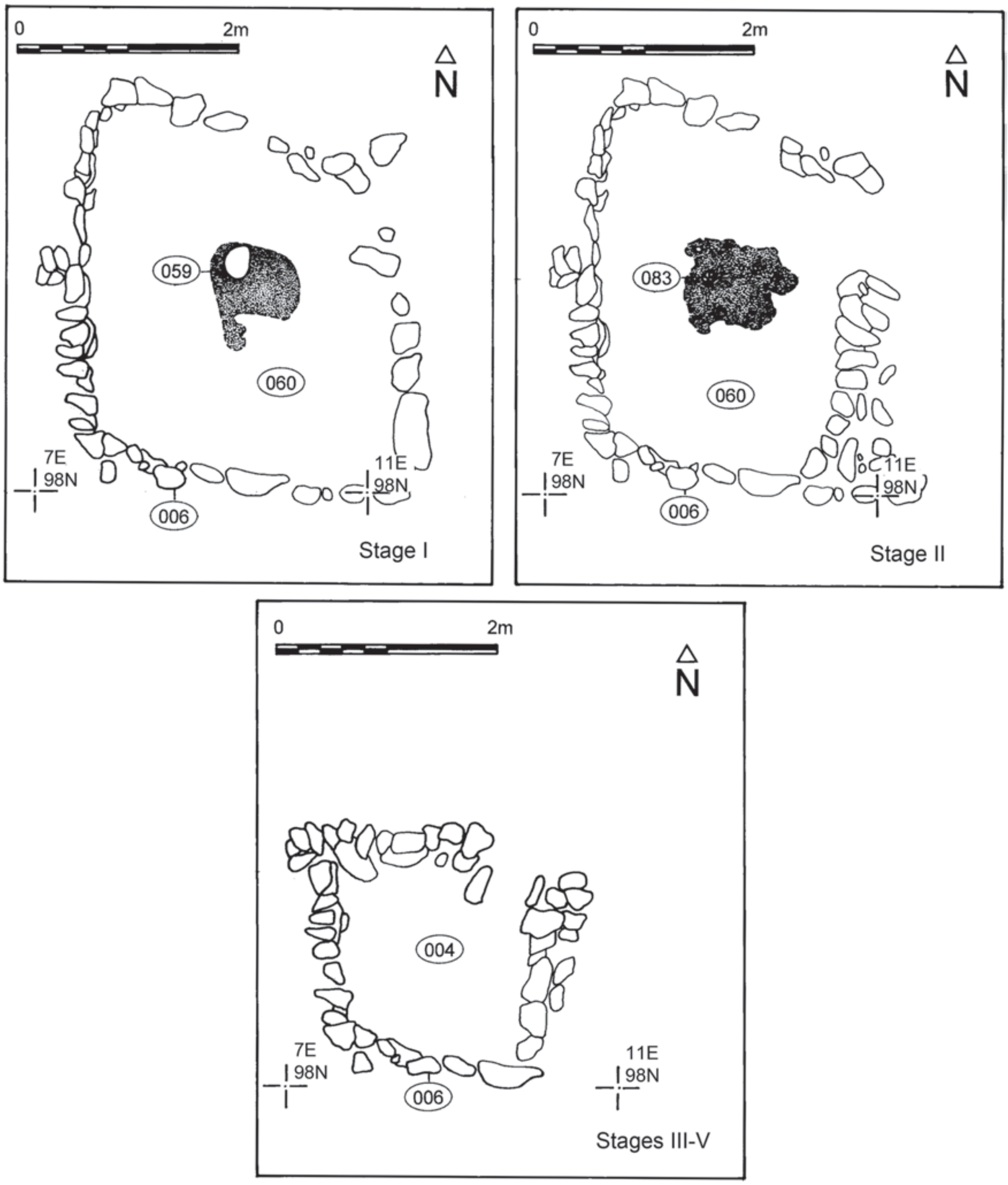


Figure 9.14. The sequence of outhouse modifications (construction stages I and II belong to phase 7, and III-V to phase 8)

(Figure 9.18). In the abandonment layer 200 (above 204), some large pieces of broken platter (SF 1244), along with a worked antler tine (SF 1245) and a meat joint in the form of articulating cattle vertebrae (SF 1246), were found in the far left (northeast) corner of the house, beyond the doorway; they were presumably placed in this corner.

Platter ware formed the majority of the ceramic assemblage within Outhouse 006. This is skewed by the recovery of large platter fragments (SFs 1119, 1120 and 1121) from the surface of the hearth (059) within the outhouse where this 'smoking gun' evidence demonstrates that platters were definitely used for cooking in here. Only one sherd out of 343 from the outhouse's hearths (059/083) and 19 out of 93 from floor 060 were not identifiable as platter ware. We conclude that the outhouse, certainly in its later use, can be identified as a bakehouse.

In addition to the high density in and on the outhouse hearth, the distribution of sherds within 060, the outhouse floor, is mostly in the doorway with smaller concentrations around the hearth (059/083) and as sweepings against the west and south walls.

Clay

The complete absence of clay from the outhouse floor indicates that it was not being stored or used here in the same way that it was in Structure 353 ('the north room') during phase 4. In these phase 7 deposits, in contrast, clay was found only in the main house's floor, in the near (or

Figure 9.15. The earliest floor (060) of Outhouse 006 with its central hearth (059), viewed from the south

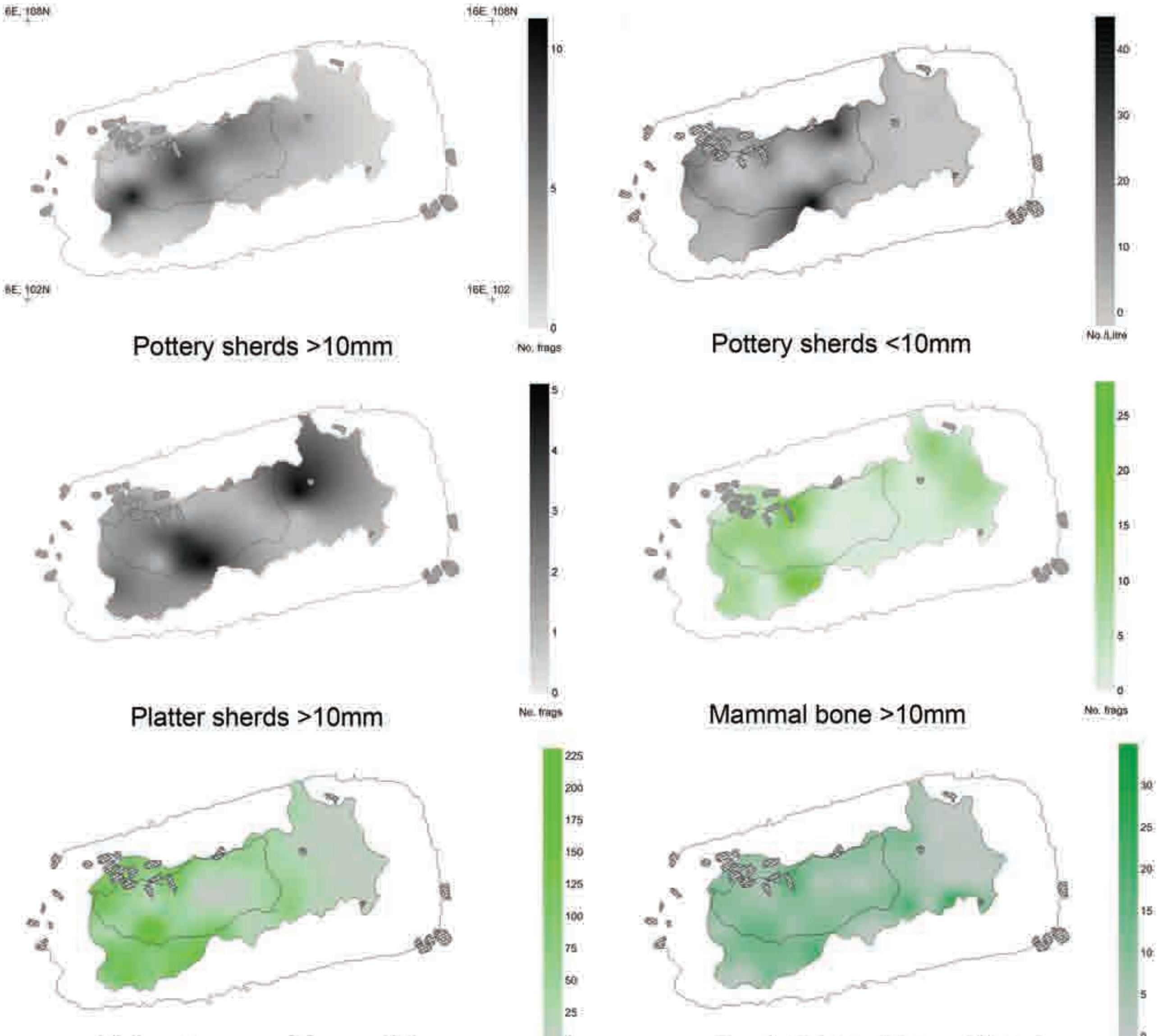


Figure 9.16. The distribution of pottery, mammal bone, fish bone, crab and eggshell in the lower floor (205, 206, 214) of House 312 (continued overleaf)

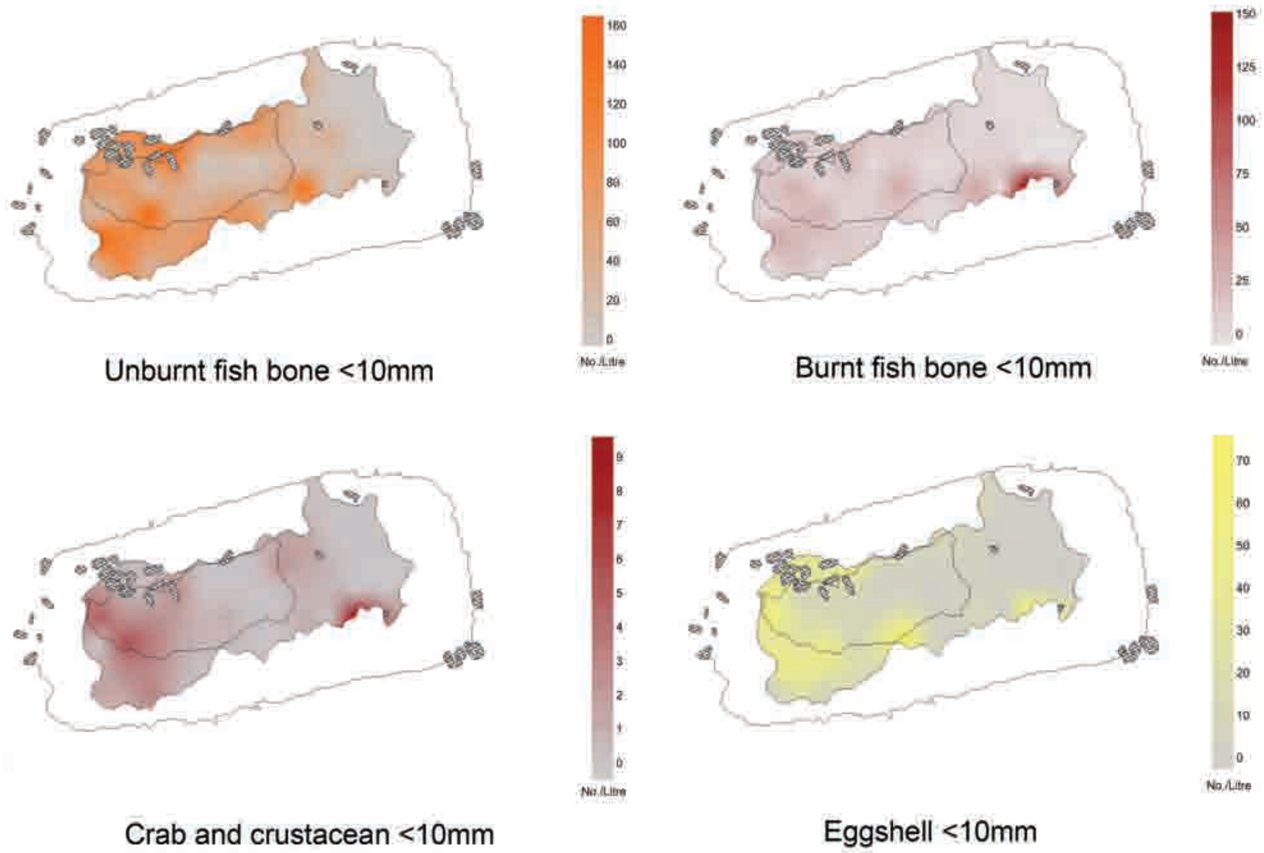


Figure 9.16. (continued from the previous page)

west) half of the house (mostly in hearth layer 205, with single examples in 204 and 214 and two examples in 206; Figures 9.17, 9.20).

There is an interesting spatial separation in hearth layer 205 between the untempered clay (mainly grey with some buff and brown) and the gneiss-gritted potting clay (grey-green and grey). The tempered potting clay was concentrated at the near end of the hearth (where sherd densities are also highest) whilst the ungritted clay lumps were further away. This indicates that potting was now probably carried out at the near (west) end of the hearth.

Animal bone fragments

Within the hearth (205) and lower floor layers 206 and 214, animal bone fragments >10mm were concentrated mostly within the near (west) half of the fireplace (Figure 9.16). There was also a lesser concentration towards the doorway. Unburnt mammal bones <10mm showed a similar concentration in the west end of the house but this was not particularly the case with burnt mammal bones. Fish bones had similar distributions (Figure 9.16).

Within layer 204, bone fragments were concentrated mostly within the area of the hearth and, to a lesser extent, near the doorway (Figure 9.18). Fish bones reveal similar patterns of discard.

As with the distribution of pottery sherds, the distribution of bone fragments in both sets of floors probably derives from multiple phases of the house's use, from occupation to abandonment. Interestingly, these distributions are very similar to those for the longhouse in phases 3 and 4. Most striking are the apparently arbitrary concentrations in central positions along the two long walls (compare Figures 9.16 and 9.18 with 6.17 and 6.22). They point to similar practices of butchery, bone breakage and house management having survived as traditional activities over several generations.

Crab and crustacean fragments (Figures 9.16, 9.18) and eggshells (Figures 9.16, 9.19) were concentrated around hearth 205 in its western half. In 204 they were more towards the centre of the hearth area (Figures 9.18–9.19).

Within the outhouse, quantities of animal bone are too small to identify any clear patterning except that, in contrast to the pottery, crab and crustacean fragments were distributed in the southwest corner of the building, furthest from the door (Figure 9.18).

Stone

Worked flint

The flint strike-a-lights and flakes in House 312 were limited almost entirely to the western half of the house interior, with the majority coming from the central area of hearth 205 (Figure 9.17). Within layer 204, flints were mostly spread along the south side of the hearth (Figure 9.20).

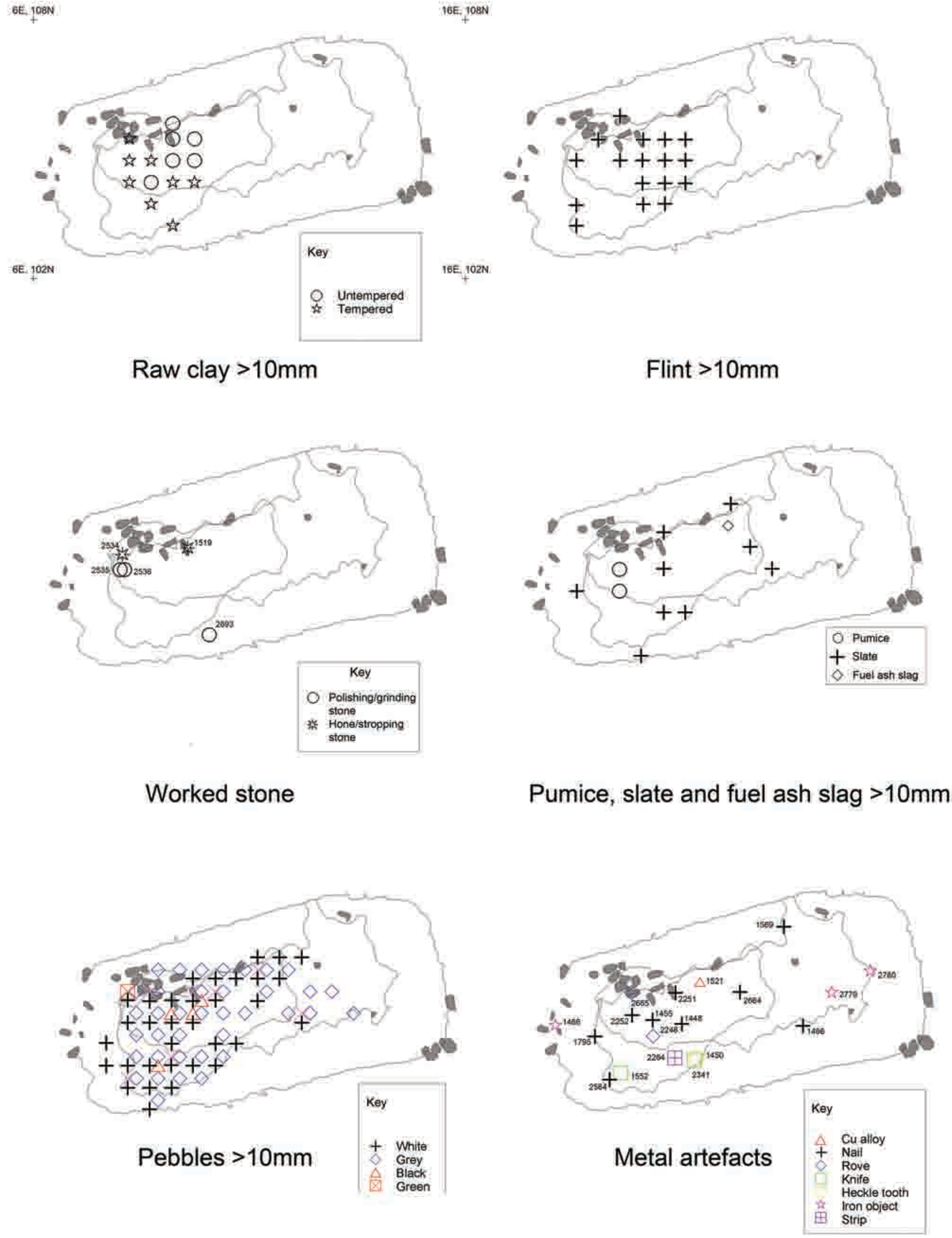


Figure 9.17. The distribution of clay, flint, pumice, slate, fuel ash slag, pebbles, metal artefacts, worked bone and antler, and Spirorbis in the lower floor (205, 206, 214) of House 312; the worked stone distribution is of both lower and upper floors (continued overleaf)

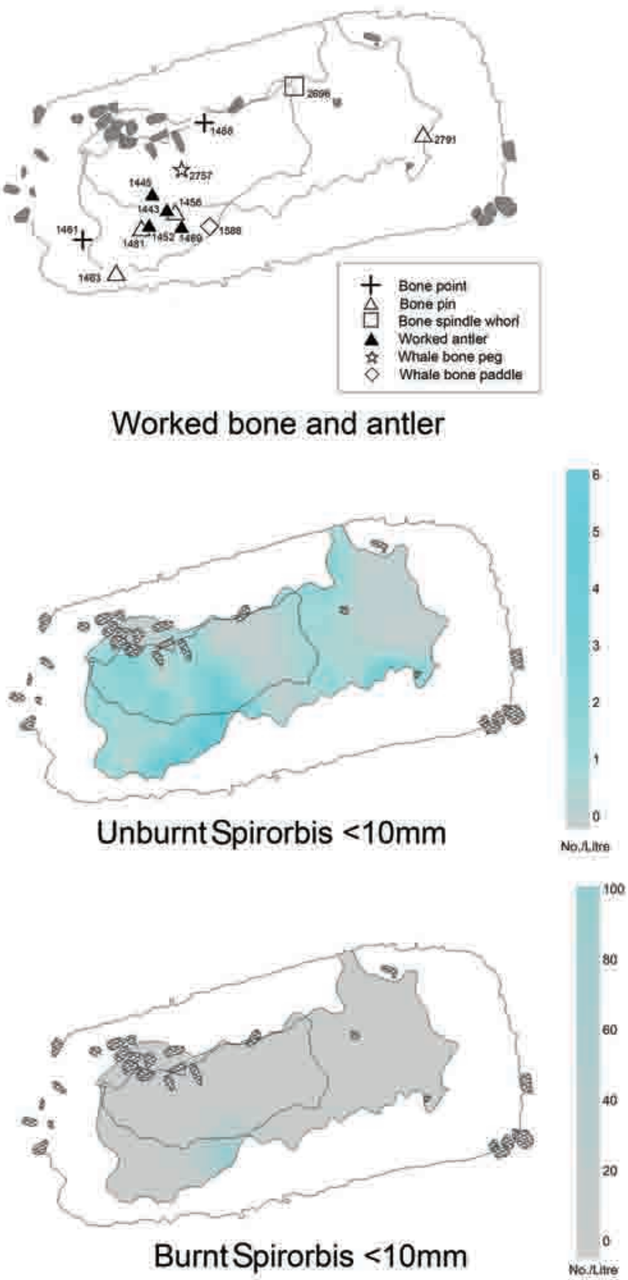


Figure 9.17. (continued from the previous page)

Stone tools

Within hearth layer 205 the stone tools were mostly located on the near left-hand (northwest) side at the end of the hearth (Figure 9.17). Slightly further east was a piece of pumice (see below). Furthest south was a third, quartz polishing stone.

This tight spatial patterning of the main group close to the end of the hearth mirrors that of the stone tools from the phase 4 floor of House 500, except that those in House 500 were on the right-hand side (Figure 6.19). In House 312 the stone tools were in a zone with only a low density of animal bone fragments. The polishing stones on the left-hand side lie close to a concentration of bone fragments with an iron knife, antler-working (consecutively in layers 205, 214 and 206) and a concentration of flint flakes.

The only worked stones from the later phase of use are a hone from 204 and a reused threshold slab within the outhouse (Figures 9.17, 9.20).

Pumice

Two pieces of pumice were found in floor layer 205, located in the western end of the hearth (Figure 9.17). Burnt pumice was retrieved from 206, also at the west end of the hearth. In contrast to pre-Norse sites, pumice was extremely rare at Cille Pheadair (see Chapter 16).

Slate

Ten pieces of green slate were found in House 312's floor layers (Figures 9.17, 9.20). Six were found in hearth deposit 205, two in 214, one in 206 and one in 204. In 205 they were distributed on the north, south and east sides of the hearth. In 214 they were to the west and south of the hearth. The piece in 204 was in the eastern half of the building, against the east wall within a small cluster of stone, bone and iron finds.

The association of green slate fragments with high sherd densities was also noticed in phase 4 where they were concentrated on the left-hand side (Figures 6.20 and 6.24). As surmised for the phase 4 material, the slate is probably the remains of pot-lids and trays used in cooking. A broken pot-lid of green slate (Table 9.2) was also found in the abandonment layer (200) above 204.

Pebbles

Within House 312 were 232 pebbles. Most of these were found in the hearth deposit (205), clustered along the north, northwest and southwest sides of the fireplace (in the western two-thirds of the house; Figure 9.17). Densities were higher along the left-hand side of the hearth but broadly the pebbles formed a U-shaped arrangement around its near (west) end. There appears to have been no colour coding in terms of marking different areas, in contrast to the patterning of coloured pebbles in phase 4.

In layer 214 the pebbles were densest in the house's southwestern corner. There was no particular concentration in floor layer 206 except that the pebbles in this layer were divided into two groups, one northwest of the hearth and the other at the hearth's east end.

In layer 204 the pebbles were densest above the area of the hearth; there were few in the area of the doorway, but there are two significant clusters by the far eastern wall of the house, with light scatters along the middle of the north and south walls (Figure 9.19).

Human and dog coprolites

In contrast to the large quantities of canine and feline coprolites found in earlier phases, there are few from phase 7 (and none at all from phases 8 or 9). This is interesting because House 007 was in a derelict state within phase 9 (see Chapter 11). Equally, the few phase 7 midden layers (described in section 9.5, below) contain no coprolites, which is unusual given their occurrence within earlier midden layers.

The only large coprolite fragment >10mm from House 312 was a human stool in layer 204, against the wall opposite the doorway (Figure 9.20). Also from floor 204, there were small concentrations of probable canine coprolite fragments across the floor and also in the doorway of the outhouse (Figure 9.19). The only other dog coprolite from this phase is a fragment within the fill (359) of House 312's wall cut (probably residual from phase 6).

Bone, antler and metal artefacts

A large assemblage of bone, antler, iron and copper alloy artefacts came from the floors of House 312 (Table 9.1). Usefully, these are divided into a number of activity clusters, which suggests that many items had not been moved far from their context of use.

Iron artefacts

There were 13 broken nails within the floor layers of House 312, in addition to clench nails and roves. Ten of the nails are from the earlier floors 205, 206 and 214 (Figure 9.17). There are three nails from 204, found widely spread across the floor (Figure 9.20).

Broken artefacts

There were clusters of broken artefacts in 205 and 214, all on various edges of the main concentration of sherds at the near (west) end of the hearth.

- On its right-hand side was a group of a polishing stone, two knives, a heckle tooth and a rove, a bone pin, three pieces of worked antler and whale bone paddle or beater (Figure 9.17).
- Behind these, in the near right-hand (southwest) corner, a broken bone point (SF 1461) lay close to a complete bone pin (SF 1463) in layer 214.
- On the near left-hand side within 205 there was a set of stone tools with a piece of pumice (see above; Figure 9.17).
- On the left-hand side in 205, slightly closer to the door, there was a stropping stone (SF 1519)) and a copper-alloy spiral terminal (Figure 9.17).
- A broken iron awl or point came from layer 214 in this western part of the house as did a broken iron needle in layer 205.
- Layer 206 contained few bone or metal artefacts. One of these was the tip of a bone pin or needle from the east end of 206, opposite the doorway (Figures 9.17).

In layer 204 the broken artefacts were:

- two fragments of iron plate and an unidentified piece of iron along the south side of the hearth (Figure 9.20);
- along the left (north) side, a trimmed whale bone fragment, worked antler, the crozier-shaped iron terminal and a bone pin (Figure 9.20);
- elsewhere in the house, a broken antler wedge lay towards the doorway on the left-hand side and there was a bone point in the doorway. Another piece of iron came from a small cluster of artefacts against the east wall, together with a broken bone pendant.

In the outhouse, artefacts from the floor (060) consisted of a broken iron needle found by the doorway and a piece of worked antler from the southwestern side of the hearth. Other finds from the floor not plotted in the figures are an antler comb-tooth, a socketed bone point, a fragment of bone point, a broken iron nail and a flint flake (Table 9.1). These are fairly similar to the assemblages from the floors of the north room in phase 5. The main differences, however, are the lack of potting clay, the large quantities of platter for baking within this outhouse, and the presence of a needle.

Complete artefacts

There are only three unbroken bone artefacts from these layers. In layer 060 a complete bone spindle whorl came from the north side of the floor, just west of the doorway. Spindle whorls are fairly robust and the fact that this artefact is complete is probably of little significance for understanding the manner of its deposition. A complete bone pin (SF 1463) came from floor 214.

The other complete finds from House 312's floor layers are a bone pin (SF 1512) and a bone pin-beater (SF 1430; location not plotted), both from 204. There is no evidence for deliberately placed closing offerings being made in this phase; perhaps the tradition of leaving a comb and pin set at the end of the hearth had died out by this phase.

Iron-smithing slag, fuel ash slag and hammerscale

Small quantities of hammerscale were concentrated in the east end of House 312 in floor 204 (Figure 9.19). A piece of fuel ash slag was found in 205, at the far left end of the hearth towards the doorway (Figure 9.17). A piece of metalsmithing slag (not plotted) was found in the southwestern corner of the outhouse, furthest from the doorway.

Spirorbis

The distribution of *Spirorbis* fragments is likely to give some idea of where seaweed was stored and burnt. Unburnt *Spirorbis* was concentrated on the south side of hearth 205 with burnt fragments in the same area but nearest the hearth itself (Figure 9.17). In the final phase, unburnt *Spirorbis* was most common immediately inside the outhouse and burnt *Spirorbis* on the south side of the longhouse's hearth and near the doorway (Figure 9.19).

9.4 Soil micromorphology of the house floor

C. Ellis

Samples MM14/MM16, MM13/MM17, MM1/MM2/6879 and 6371

The lowermost sampled deposit, layer 214, is a windblown sand with few clasts of sandy peat and turf ash and very few fragments of bone. The boundary between layers 214 and 205 dips at 25°; this is probably a result of the accumulation and protection from disturbance of the deposit against the wall of the house (Figure 9.6).

In Sample MM14, layer 205 lies upon a windblown sand with a significant sandy peat ash component and rare clasts of turf ash with very few diatoms; there are rare fragments of unburnt peat. The few fish bones lie parallel to the direction and angle of dip, at roughly 12°.

However, layer 205 in Sample MM17, which was taken from near the centre of the house, is dominated by sandy peat and turf/grass ash in the form of microlaminated bands of silty sand and sand. There is one thin lamination of wood ash that appears to be the last firing of the hearth; it is associated with fragments of burnt bone. The laminations are angled at 15° from horizontal and the boundaries between the laminations are very sharp and thus indicative of separate episodes of deposition occurring over a relatively short timespan. It is clear that the fuel burnt on the hearth (205) was predominantly sandy peat and/or sandy turf with odd firings dominated by wood.

In Sample MM17 the final ash layer of 205 was followed by an episode where limited amounts of windblown sand, mixed with much sandy peat and turf ash, were deposited (206). This was then followed by a phase in which thin bands of ash (wood and sandy peat/turf) accumulated; some of the peat ash appears to have been produced in a high-temperature fire (around 800°C). These ash layers may represent *in situ* firings of the hearth or, alternatively, thin spreads of hearth ash that were allowed to accumulate adjacent to the hearth proper. The survival of the thin and delicate laminations demonstrates that these deposits were not trampled or disturbed during their accumulation.

There are a very few calcite spherulites within the peat/turf ash of layer 206 and these are likely to represent dung that was within the matrix of the turf prior to its being utilized as a fuel, rather than representing actual utilization of herbivore dung as a fuel.

Layers 206 and 204 are windblown sands with clasts and lenses of sandy peat and turf ash; there is more turf/grass ash, from a fairly damp source, in 206 within MM13 than is observed in MM1 and MM16. The boundary between these contexts (206 and 204) dips at 30°, but it is diffuse, indicating continued accumulation but with a slight change in the rate and source of the ashy content. Since the archaeological evidence indicates that layer 206 represents an occupation deposit, it is likely that the windblown sand was deliberately introduced, presumably to clean up the floor.

In Samples MM16 and MM2, two bands separated by a diffuse boundary are visible within layer 204. The lower bands are dominated by windblown sand with very few clasts of turf ash, few clasts of burnt peat, the odd fragment of bone and, in MM2, two small fragments of pottery. The upper bands are also windblown sand that has been affected by post-depositional bioturbation. The fine material comprises amorphous organic matter mixed with peat and turf ash; again there are a few clasts of sandy peat/turf ash and very few clasts of wood ash. Similarly, three bands are visible in Sample MM1:

- The lower band is a windblown sand with a few lenses of sandy peat/turf ash.
- However, this gradually changes into a band of mixed windblown sand and ash, where the ash is predominantly derived from peat and turf. A thin layer of micrite, surrounding mineral grains and within which are a few silt-sized fragments of charcoal, is interpreted as a weathered wood ash.
- The upper band is dominated by a band of charred peat within which are a few fragments of burnt bone, including probable fish bone. Interestingly, the top of this band is dominated by small feldspar-rich rock fragments that bond and are incorporated into the top of the peat; this may be the remnants of the coarse mineral soil from which the peat turf was removed and, if so, the burnt peat turf is inverted.

Similarly, in Sample MM13, turf and sandy peat ash dominate layer 204, presumably because this sample was located near the centre of the house where the ash deposits originated. Despite having been disturbed by some post-depositional bioturbation, the deposit retains a weak horizontal orientation.

Five distinct bands are visible in layer 204 within sample 6371 which was taken from the centre of this deposit, near to the door of the house (Figure 9.6):

- the lowest band is a windblown sand, with very few windblown clasts of sandy peat ash;
- the next is a thin band of mixed windblown sand and sandy peat/turf ash;
- the next is a band of windblown sand with a significant (windblown?) turf ash component;
- the next is a thick band of sandy peat/turf ash with a few burnt bone fragments;
- finally the sequence is capped by a windblown sand.

The sharp boundaries between each of these bands are indicative of abrupt changes in the type of material accumulating. There are two possible explanations for the mode of deposition of the windblown sands with peat/turf ash:

- either they were deposited by aeolian processes, the ash being incorporated from nearby eroding midden deposits,
- or fresh windblown sand was deliberately brought into the space to act as a cleansing layer and it was while such sand was being spread that the ash became incorporated.

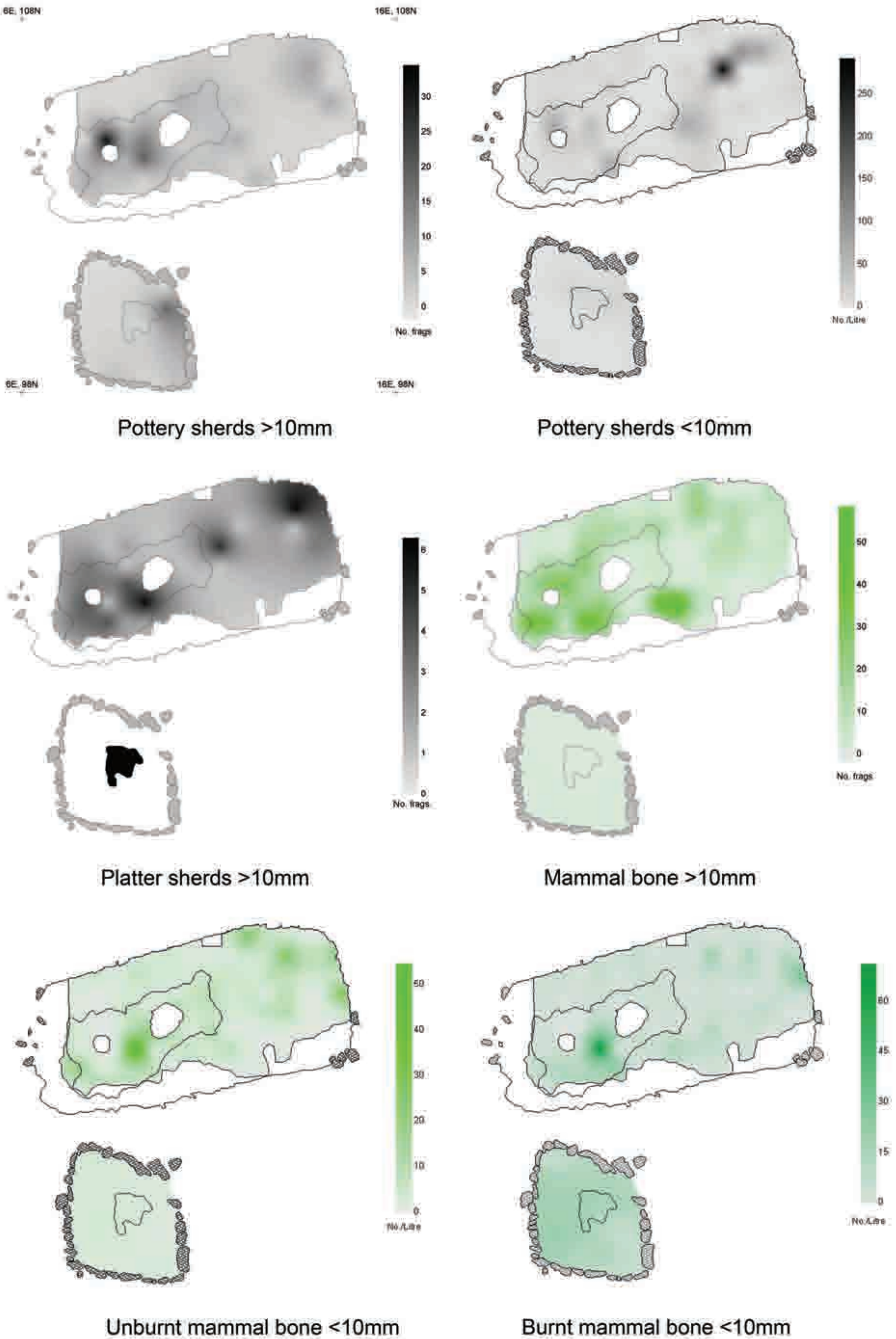


Figure 9.18. The distribution of pottery, mammal bone, fish bone and crab in the upper floor (204) of House 312 and in floor 060 of Outhouse 006 (continued overleaf)

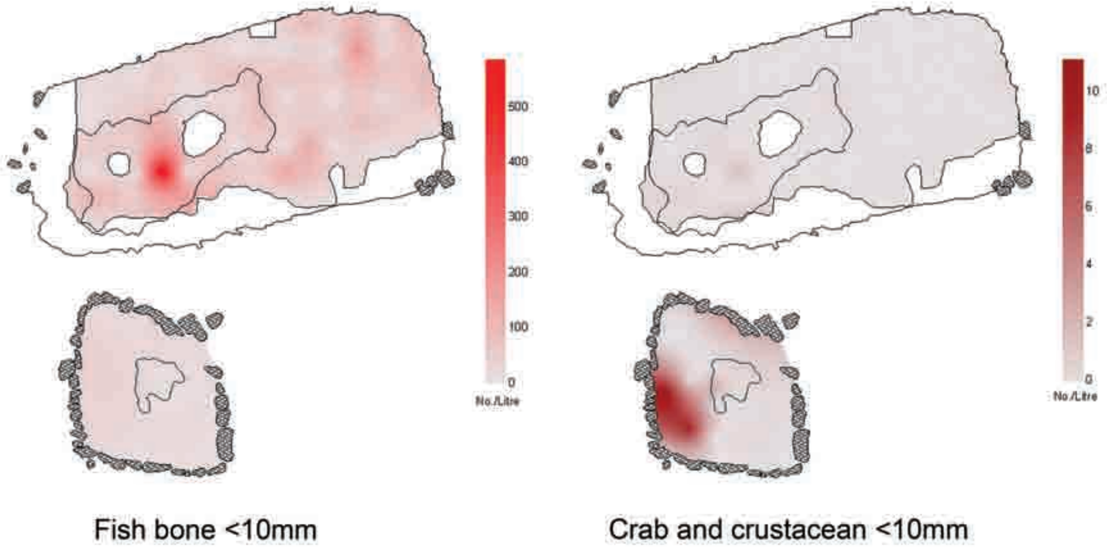


Figure 9.18. (continued from the previous page)

Table 9.2. Phase 7 non-ceramic artefacts by context from abandonment layers

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 7: ABANDONMENT				
windblown sand	201	1126	hone	16.3
		see Chap 15	iron nails	
windblown sand	202	1287	bone scoop fragment	14.2
windblown sand	203	1254	stone polisher fragment	
		see Chap 15	iron awl	
windblown sand	200	1208	decorated bone mount, probably same artefact as SF1016 (Table 7.3)	13.14
		1206	bone needle fragment	
		1245	worked antler tine	14.4
		1112	worked slate (pot-lid)	16.6
		see Chap 15	iron clench nails, rove, nail, plate fragments	
windblown sand	311	2809	comb tooth-plate	
		2810	comb tooth-plate	
		2793	bone needle fragment	
		1276	worked bone	
		1131	stone polisher fragment	
		1149	stone polisher fragment	
		see Chap 15	iron billhook, clench nails, rove, nails, unident fragments	
windblown sand	303	2799	bone point, tip broken	
		1056	worked whale bone	
		see Chap 15	iron clench nail, roves, nails	

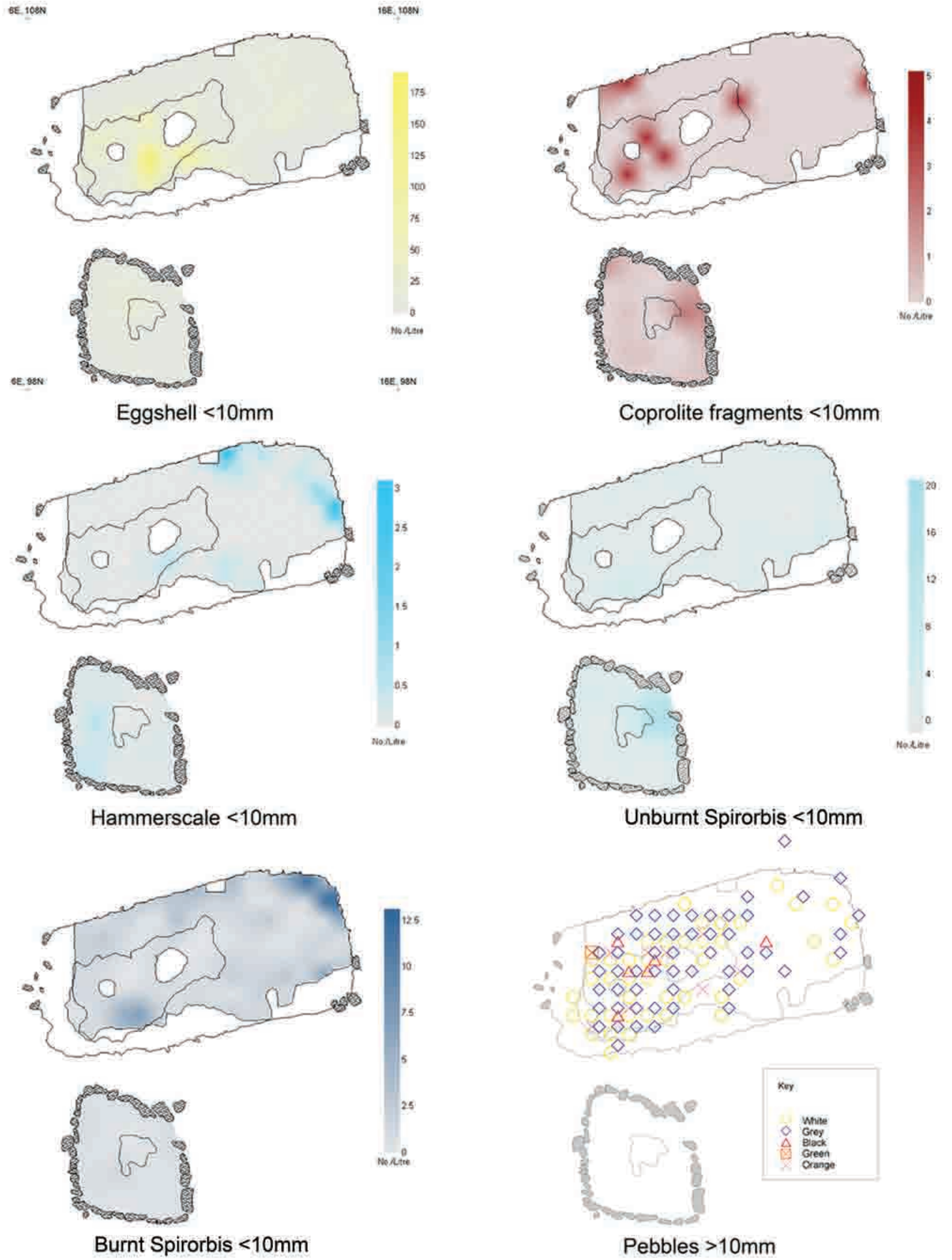


Figure 9.19. The distribution of eggshell, coprolites, hammerscale, Spirorbis and pebbles in the upper floor (204) of House 312 and in floor 060 of Outhouse 006

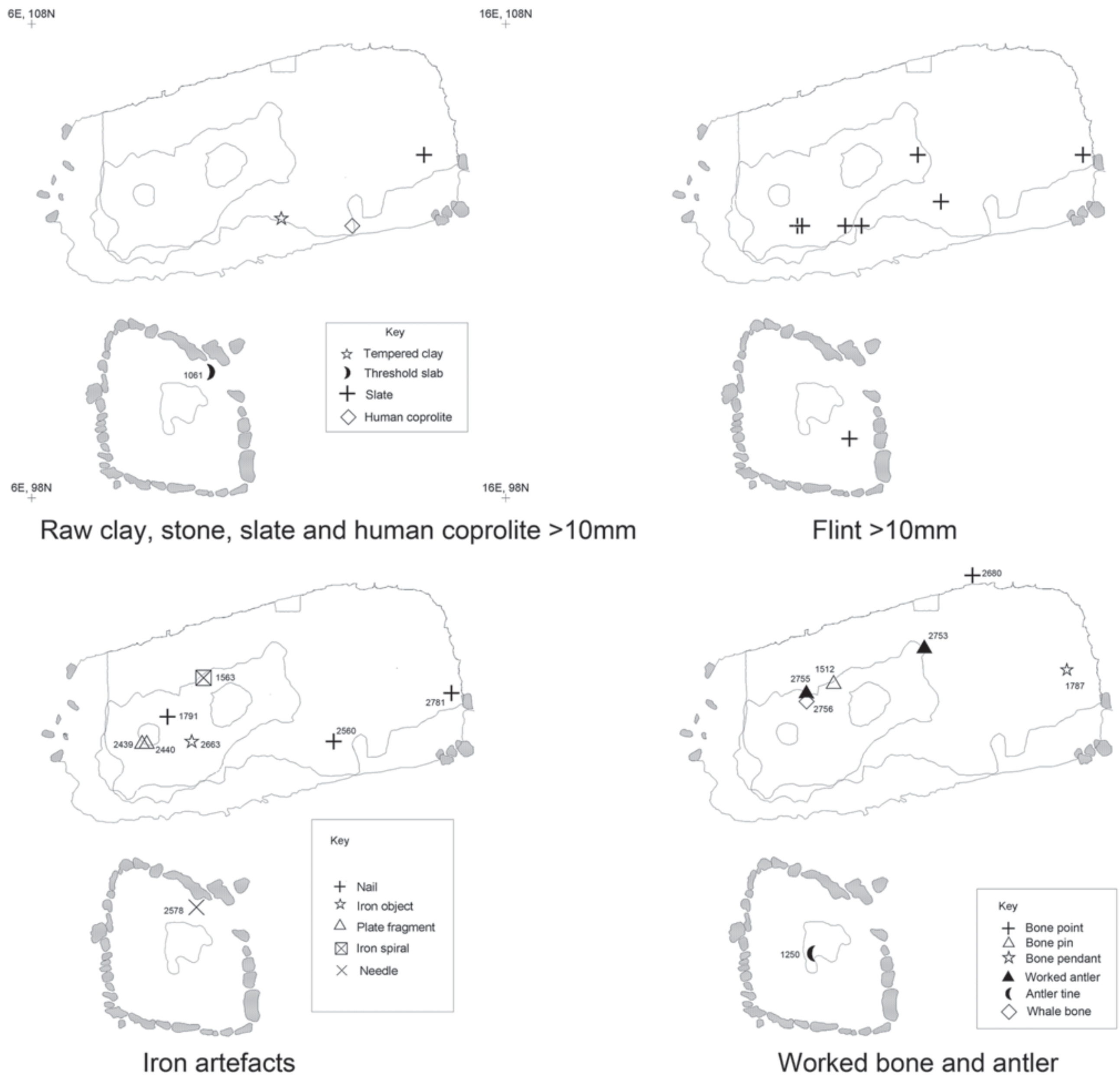


Figure 9.20. The distribution of clay, architectural stone, slate, coprolites, flint, iron artefacts, and worked bone and antler in the upper floor (204) of House 312 and in floor 060 of Outhouse 006

9.5 The midden deposits

M. Parker Pearson and M. Brennand

The uppermost layers of the northeastern midden in this phase of activity were a multi-layered spread of organic-stained and windblown sands. They are considered to be contemporary with the occupation of House 312 because they all lie above layer 010 which is the last midden layer to be cut by House 312 or features linked with that house. In the northwestern part of the site were a series of other midden layers.

The northeastern midden

The extensive spread of dark grey-black organic sand (010) at the top of the phase 5 sequence of midden deposits was truncated by the walls and soakaway of House 007 in phase 8. Overlying 010 was a sequence of midden deposits associated with phase 7 (see Figure 3.14).

The lower layers

The lowest midden layers belonging to the phase 7 sequence were 020 and 375, both small localized spreads. Layer 020 was a compacted reddish-brown/grey midden layer filling a shallow depression (Figure 3.14) and containing comb fragments (Table 9.3). It covered the grey-white sand fill (037) of a shallow oval pit (038) cut into 010 (Figure 9.2). Layer 375 was a compacted dark grey loam containing shell, stone, charcoal and a comb fragment. Beneath 375 was a cobbled surface (372) interpreted as a stack-base (Figures 9.2, 9.21).

The north–south gully

A gully (unnumbered) cut through midden layer 020. It ran north–south and was filled with a reddish-brown/grey sand fill (022) below two whitish-brown sand layers (300 and 301; Figure 9.2). The gully was only recognized in section after it had been excavated. It aligns with the entrance of House 312 and was at first thought to be a footpath leading from the doorway of the house (from which it was separated by the cut of House 007 in phase 8). However, the gully's V-shaped profile and the stones lining its bottom suggest that it had some other use. It was most probably a soakaway associated with the doorway of House 312, although the angle of incline along its base was southwards towards the door.

The fills of the gully towards its southern end were covered by a layer of dark brown sand and shells (116, which survived only between the construction trench and eavesdrip gully for House 007 of phase 8, described in Chapter 10). Layer 116 was also above 010 (phase 5). Together, layers 116, 020 and 375 along with the gully, pit 038 and the cobbles (372) were all earlier than layer 009 (below).

The upper layers

An extensive layer of dark grey-brown peaty sand (009) covered the entire eastern edge of the site and was truncated in phase 8 by the east entrance passage and soakaway ditch of House 007 (see Chapter 10). Layer 009 contained a copper-alloy annular brooch and a number of nails and roves (Table 9.3).

Although the stratigraphic relationship of layer 009 with House 312 was severed by the construction of House 007 in phase 8, it might well have formed out of the sweepings ejected though House 312's doorway. Two further layers (008 and 036) were probably contemporary with 009. Layer 008 was a 2.00m x 1.00m smudge of dark grey-brown sand that might have either been part of 009 or was spread on top of it. Just southeast of it, 036 was another localized midden layer, containing two comb fragments; the relationship of 036 to layer 009 was uncertain. A shallow sub-circular pit (018), 0.50m in diameter and filled by a white sand with shells (019), was cut into 009 in the northeast corner of the site (Figure 9.2).

The layer on top of 009 and covering the southern half of the northeastern sector of the site was a cream-coloured windblown sand (362). Within the east–west section across this part of the site (Figure 3.14), 362 could be equated with both 322 and 327 which were spread over the northwestern sector of the site.

The northwestern midden

In this northwestern area were three layers belonging to phase 7. The lowest were 331 and 327, both shelly dark brown sands in two small spreads. Layer 331 was partially removed in phase 8 by the northwestern corner of House 007 and its eavesdrip gully but 327, lying further northwest, was cut only by House 007's eavesdrip gully. Layer 327 was covered by 322 (a white windblown sand) that blanketed the northwestern quarter of the site (Figure 3.2). Layers 327 and 322 contained a number of bone and iron artefacts (Table 9.3)

The windblown sand layer 322=362 was covered by four localized layers within the northwest, arranged approximately in a southeast–northwest line. At the southeastern end was 329, a light grey-brown sand containing a fragment of decorated copper-alloy sheet, and cut by House 007. West of it lay 330 and to the northeast was 316. Layer 330 was a dark grey-brown sand layer that contained a large quantity of iron artefacts (18 nails, clench nails and roves). Layer 316 was a brown-orange compacted sand that extended about 4.00m in diameter. To the west of it was layer 035, a thin and smaller spread of compacted dark brown sand with charcoal, cobbles and burnt stones. Layer 035 was partially covered on its west side by a small spread (033) of light grey-brown sand that extended to the western edge of the site.

The southern end of the site

This area south of House 312 and east of Outhouse 006 was left largely unexcavated. It consisted of yellow and light brown sand layers with few inclusions. Some of these might have been formed out of the upcast from the rectangular house trench for House 312. The only deposit sampled was 046, a deep, fine, yellow sand layer with much bone as well as shells, pottery and ironwork. It lies on top of and to the south of the southeastern midden that accumulated in phases 3 to 5.

9.6 Artefacts and other remains from the house and its associated deposits

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

During this phase the site was once again a thriving farmstead, with all of the daily household and farmyard activities represented in a large and varied artefact assemblage.

Fragmentation

The contexts in this phase (Figures 9.22–9.23) can be grouped into:

- floors (longhouse, outhouse and stack-base),
- construction layers,
- midden layers (northeast, northwest and south),
- fills of cut features (pits and a gully),
- abandonment layers.

Floors

The assemblages from the longhouse floors are all large (except for the inter-floor fills 216 and 218 and the lower entrance layer 378 which are too small for fragmentation analysis to be meaningful). Given that trampling can be expected to have occurred on floor layers, it is surprising

that only 206's profile is dominated by small bone fragments, whilst bone fragments from the hearth (205) and the southwest corner of the house (214) are verging on the large size. Proportions of pottery (in relation to bone) are medium (around 20%), slightly higher in 204 and 205 than in 206 and 214. Sherds are smaller in 204 and 206 than in 205 and 214. In contrast to interior floors, there is virtually no pottery from the doorway layer (217).

The floor of the outhouse produced a very different pattern. Quantities of bone are negligible in 060, 059 and 083 and each profile is dominated by large quantities of small sherds. For the upper hearth 059, the presence of many small sherds is created to a large extent by the extreme fragility of platter ware during and after excavation. Large platter sherds recorded *in situ* in 059 cracked into many small fragments, and could not be lifted intact.

The only outside 'floor', within the northeastern midden, is the stack-base (372; Figure 9.21), which produced only medium quantities of large bones (and no sherds) embedded amongst its cobbles. This is a typically 'outdoor' pattern of fragmentation. The position of this cobbled area within a growing midden indicates that it was not in use for long.

Construction layers

The quantities of pot and bone from the wall fill 388 are too small for analysis but quantities from wall fill 359 and the levelling layer 209 are large. Proportions of pottery are low in both cases and bones and sherds are more fragmented in 359 than in 209.

Middens

Of the midden layers in the northeast, only layer 116 had significant quantities of material. Amounts from layers 009, 020, 036, 362 and 375 are of middling size and the quantity of material from 008 is too small for fragmentation patterns to be recorded. Three of the layers in the northwestern midden had large quantities of bone and pot (316, 322 and 327), with the rest of the layers producing either medium-sized assemblages (033, 035 and 330) or quantities too small to analyse (329 and 331). The only layer in the south, 046, produced a medium-sized assemblage.

There is no spatial patterning of fragmentation profiles, in contrast to the patterning in the northeastern, eastern and southeastern middens in earlier phases. In five layers the proportion of pottery is much higher than bone, with large bone fragments and small sherd sizes in 035, 046 and 009, medium-sized bones and medium-sized sherds in 020, and large-sized bone and medium-sized sherds in 036. Layer 330 contained equal proportions of medium-sized bone and small sherds. In layers 116, 327 and 375, medium-sized bone predominates, with medium ratios of small-sized sherds. Small proportions of small sherds (316, 322) or medium-sized sherds (033) occur with medium-sized bone profiles. Finally, layer 362 contained mainly small-sized bone fragments and no sherds.

The fragmentation profiles cast some doubt on the stratigraphic equivalences 322=362 and 035=316=330. It is possible from this analysis that layer 116 (covering the gully) is the same as layer 327 (in the northwestern midden). Overall, these midden layers show a high degree of variation in the fragmentation of material contained within them, more so than in earlier phases. Most of the tipping of waste materials was probably happening on the edges of the settlement mound, well outside the excavation area, but these are the residues of materials that probably derived from within House 312, given the medium and high ratios of sherds to bones in nine out of 12 of the layers.

Fills of cut features

Of the gully fills, only 300 and 022 contained pottery and bone and then only in middling amounts. In both cases the proportion of pottery is much higher than bone. The sherds are more fragmented in fill 300 than in 022.

A large assemblage came from the fill (037) of pit 038. The proportion of pottery is again much higher than that of bone but pottery is generally present as small sherds in comparison to medium-sized bone fragments. The quantities of sherds and bones from the fill (019) of pit 018 are too small for comment.

Abandonment layers

Three of these mostly windblown sand deposits produced large assemblages. They contained medium-sized bone fragments with medium proportions (about 20%) of pottery. These sherds are mostly small in 201 and 311 and of medium size in 200. A medium-sized assemblage from the clean sand (303) at the top of the filled-in house is dominated by small bone fragments and only a handful of sherds, mostly of medium size. Layers 202 and 203 produced too little material for comment.

Bone, antler and metal artefacts

Contexts of this phase produced 11 bone pins and a new range of metal ornaments – iron and copper-alloy spirals from the longhouse floor, and the copper-alloy brooch and sheet fragment from the midden (all SF numbers are in Tables 9.1–9.3). The finds from the floor layers have been mentioned above. In this phase, for the first time, comb fragments are rare, both within the buildings and in other contexts. Except for a single comb tooth in the outhouse floor, no comb fragments were found in interior floors. The comb fragments were restricted to:

- the windblown sand (311) covering the abandoned house,
- the gully fills 022 and 300,
- the midden layer (116) covering the gully,
- midden layers 020, 036 and 375.

There is no significant variation in artefact types from the different midden areas. In the northwestern and northeastern midden areas, the largest amounts of ironwork came from 009, 303, 322 and 330, mostly in the form of nails and clench nails or roves.

Amongst the ornaments and tools from the midden and gully layers are:

Table 9.3. Phase 7 non-ceramic artefacts by context from middens

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 7: MIDDENS AND GULLY				
northeastern midden	020	1009	fragment of a single-sided composite comb	13.5
		1010	fragment of a single-sided composite comb	13.5
		1276	fragment of a single-sided composite comb	13.5
		see Chap 15	iron rove	
	375	1476	fragment of a single-sided composite comb	13.5
		2699	smoothed rib bone	
		2533	stone polisher fragment	
	009	1453	copper-alloy annular brooch	13.15, 13.22
		see Chap 15	iron clench nails, rove, nails	
	036	1024	fragment of a single-sided composite comb	13.5
		2485	fragment of a single-sided composite comb	13.5
		see Chap 15	iron rove	
	116	2482	fragment of a single-sided composite comb	13.5
		1879	perforated-head bone pin	13.13
		1886	bone point fragment	
		see Chap 15	iron needle	
gully fill	022	1290	comb tooth-plate	
		1019	bone spatula	14.1
		see Chap 15	iron clench nail	
	300	2486	comb tooth-plate	13.5
		2697	bone point fragment	
		see Chap 15	iron nail	
northwestern midden	033	2476	perforated decorated bone pin fragment	
		2475	bone needle fragment	
	327	2794	bone pin fragment	13.13
		see Chap 15	iron clench nail, nail, unident fragment	
	322	1575	bone pin fragment	
		2479	triangular-head bone pin fragment	
		2480	bone peg fragment	
		1888	bone point, possible awl	
		see Chap 15	iron clench nails, rove, nails	
	329	1169	decorated copper-alloy sheet	13.15
		see Chap 15	iron rove	
	330	see Chap 15	iron clench nails, roves, stud, nails	
	316	1125	stone polisher fragment	
		see Chap 15	iron clench nails, roves	
southern midden	046	1279	worked bone (spatula?)	
		see Chap 15	iron nails	

- bone pins from midden layers 033, 322 and 327, and from layer 116 overlying the gully;
- a bone peg from midden layer 322,
- bone points from 322 (a possible awl) and 116, and a possible point from gully fill 300,
- an iron needle from 116 and a bone needle from 033,
- a bone spatula from gully fill 022, a possible spatula from southern layer 046 and a bone smoother from midden layer 375.

Layer 046 produced only three nails as well as the fragment of bone spatula, but just a small part of this context was excavated.

Of the construction layers, the wall fill (359) produced only an iron arrowhead, a clench nail and a rove. Given that an arrowhead was similarly found in a construction deposit in phase 6, it seems likely that the inclusion of one in 359 was deliberate.

The make-up layer 209 contained three bone artefacts, consisting of a point (or awl), a needle and a complete pin, as well as 14 iron items. Most of the ironwork from layer 209 consists of nails and roves but a complete gouge was also found here. Whilst there was a lot of broken material in 209, the inclusion of a complete pin and a complete gouge might again have been deliberate.

The final floor (204) within House 312 had numerous small artefacts scattered across the floor, mostly in the western half of the building. These include two metal spiral ornaments, two bone pins, a hone and a polishing stone and a whale bone paddle (see Figure 25.12). Isolated at the east end was a polished bone cross pendant, possibly a deliberate closing deposit.

The abandonment layers above House 312 contained 31 iron items. All of the ironwork consists of nails, roves and scraps except for a broken billhook blade in 311 and a possible iron awl in 203. The abandonment layers contained few bone artefacts:

- a bone point and a worked whale's earbone in 303,
- two comb fragments and a bone needle in 311,
- a bone scoop in 202,
- a bone mount, a bone needle and a piece of worked antler in 200.

Iron-smithing slag and fuel ash slag

There was less slag in these phase 7 contexts than in any preceding phase. With just four lumps from phase 6, it is likely that iron-working in the vicinity had tailed off or even stopped at the end of phase 5. In phase 7 one piece came from the outhouse floor and the other from layer 009 in the northeastern midden. A piece of fuel ash slag came from 035.

Ceramics

The ceramic repertoire is much closer in composition to that from phase 5 than phase 6, no doubt because of the lack of a dwelling focus in phase 6. The higher proportion of convex to curved forms returned, as did the higher ratio of organic impressed to rough finishes, and the dominance of medium over thick sherds. There was also a swing to thinner sherds, slightly more strongly than in phase 4, and the rims of phase 7 are generally recognizable by their slim and fragile profiles. Numbers of flat, shallow rounded, flat rounded, tapered and slightly everted rims also increase in this phase.

Figure 9.21. Stack-base 372, viewed from the west

Vessel sizes are within the ranges of previous phases except that a bimodality in diameters was developing at 180–220mm and 300–350mm for rims and 180–260mm and 300–350mm for bases. The shallow base angle introduced in phase 6 also continued in this phase. Colour variations are the same as in phase 5 except that the pinker end of the scale has almost disappeared. In terms of fabric types, B now virtually disappears, to be replaced by C, D and E.

Evidence of use of the pottery indicates a swing back to domestic cooking activities, indicated by the higher percentages of blackening (11.8%), sooting (16.2%) and carbonized residues (8.5%), with a fall in off-white residues (3.9%). Nonetheless, the quantities of such residues never quite climb back to where they were in phase 5. This is interesting because it tallies with the lesser degree of fragmentation for sherds and bones on the longhouse floor and may indicate that occupation was less intensive or more short-lived than in phase 5. The average sherd weight (5.4g) in phase 7 is the lightest for any phase but this is because of so much fragile platter ware breaking on discovery into small pieces.

The number of conjoins in phase 7 (n=139) is the greatest for any phase, perhaps not surprisingly since it is the second largest assemblage. There are many fewer conjoins on the house floor (n=36) than found in the phase 4 longhouse assemblage, and most are in the midden layers and the abandonment fills. A small number (n=15) were found in the construction layers.

With 11 contexts containing higher proportions of sherds to bone and another nine with 20% ratios (out of 30 measurable contexts), there seems to be much more pottery in relation to bone fragments in phase 7 contexts. This may indicate that it was becoming increasingly common. Very rarely do contexts in earlier phases contain equal or greater numbers of sherds to bones.

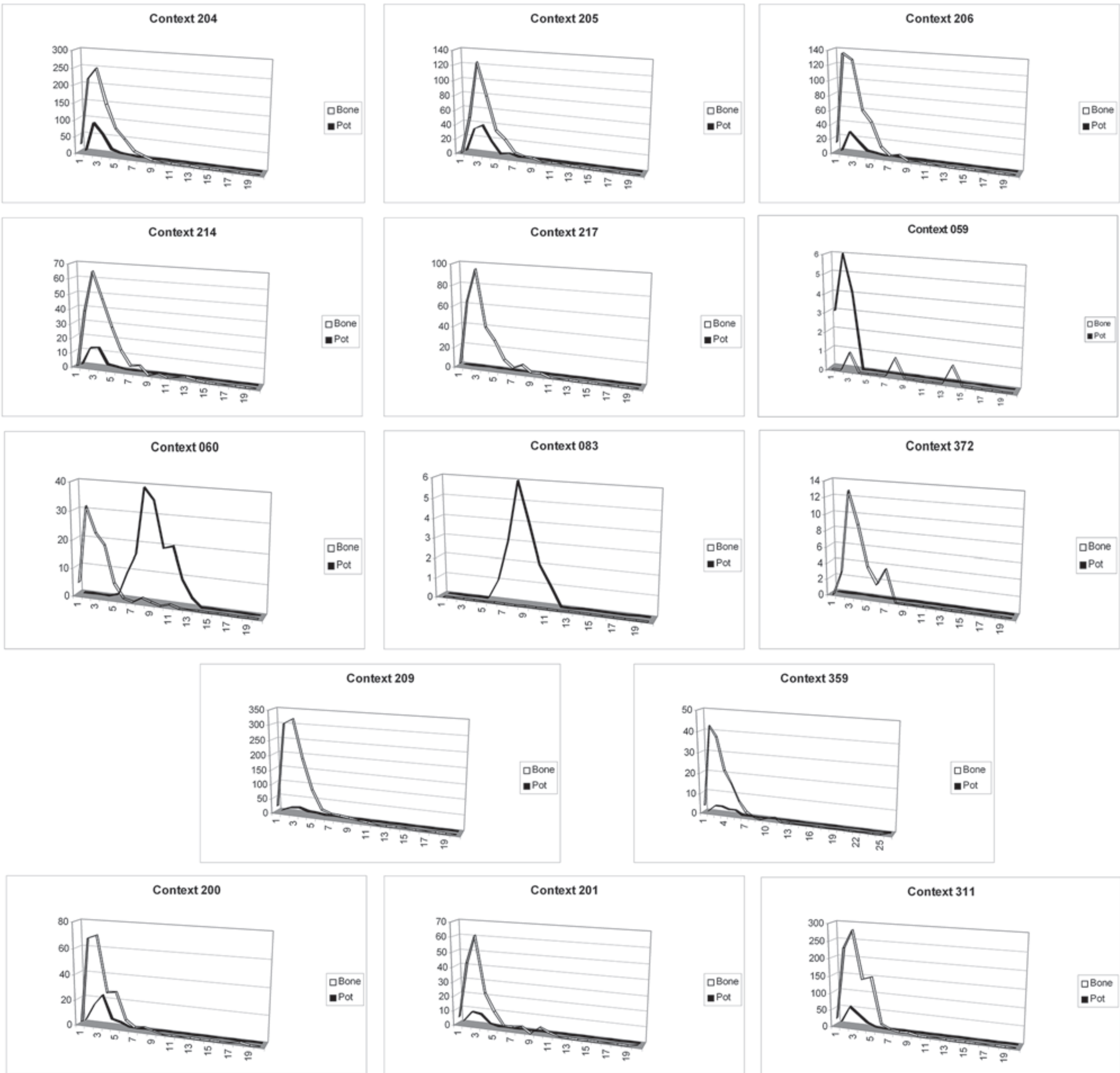


Figure 9.22. The fragmentation of sherds and bones in phase 7 floors (204, 205, 206, 214, 217, 059, 060, 083, 372), construction layers (209, 359) and abandonment layers (200, 201, 311)

Platter ware

There were a few changes in emphasis or proportion in platter forms. Exterior finish is as in phase 6 but interior finish includes an increase in channelling and, to a lesser extent, grass-marking and seed impressions. Round rims were on their way out. Orange and pink surface coloration on the exterior and orange on the interior are much greater than before, perhaps indicating higher firing temperatures. Also, there is in this phase much more evidence of sooting and blackening, causing the platters to be more brittle than before.

With platter ware forming 44% of phase 7's ceramic assemblage, it was enjoying the heyday of its popularity, which would last into phase 8 but not beyond. As noted above, platter ware was used in smaller proportions (24%) to bowls (76%) within the longhouse and wholly dominated the outhouse assemblage. When examining the proportions of platter to other pottery in other contexts, it is clear that it tends to occur in the same low proportions as from the longhouse floor (*i.e.* about a quarter of the total of ceramics in these other contexts). Eleven contexts have these low platter ratios and only seven have equal or almost numbers. These are 020, 033, 035 and 375 from the northeastern and northwestern middens, 209 from the construction fills, 200 from the abandonment layers and 022 from the gully. Besides the outhouse, the only context almost entirely dominated by platter is the fill (037) of pit 038 within the northeastern midden.

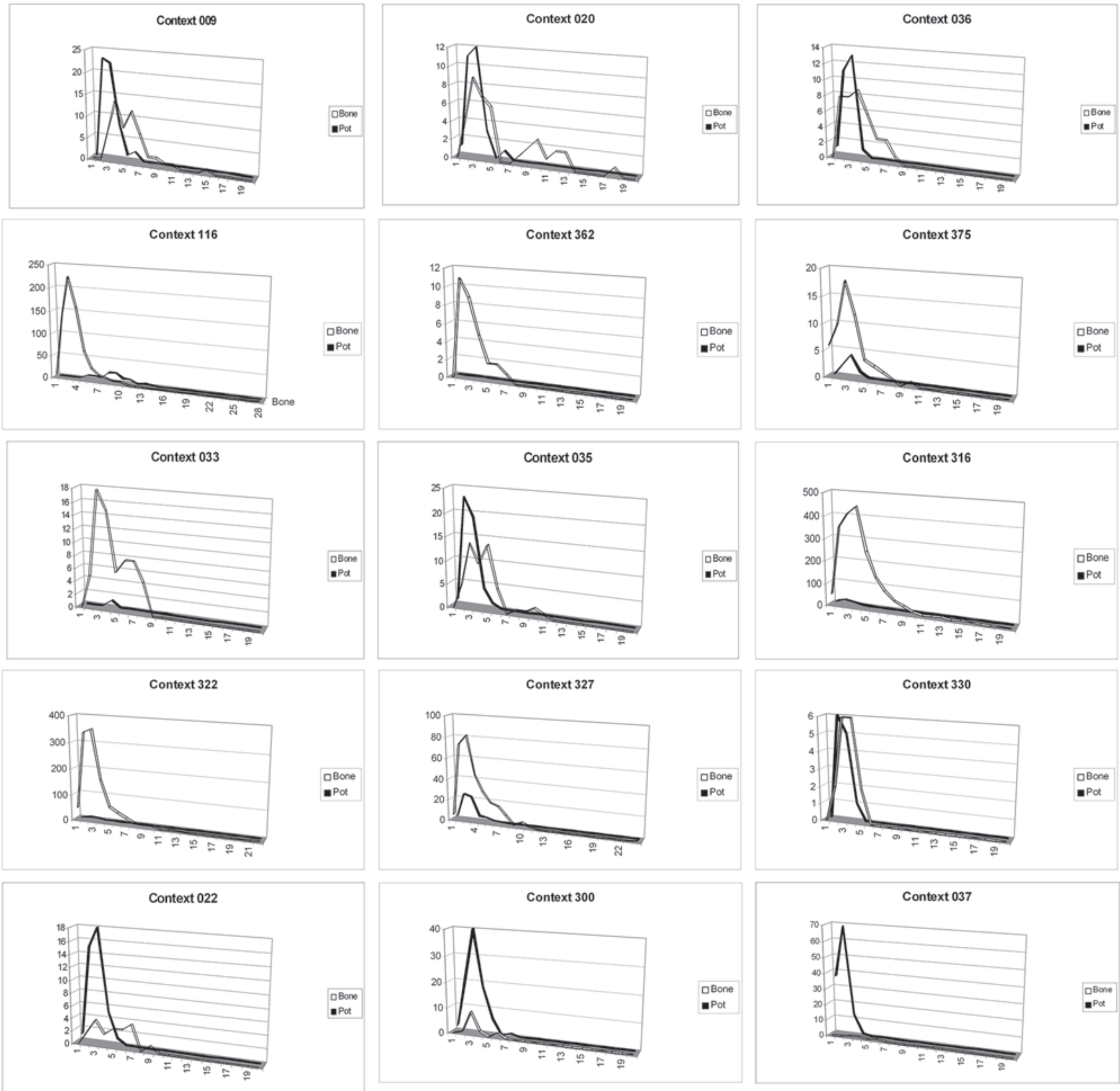


Figure 9.23. The fragmentation of sherds and bones in phase 7 northeastern midden (009, 020, 036, 116, 362, 375), northwestern midden (033, 035, 316, 322, 327, 330), fill layers of gullies (300, 022) and a pit fill (037)

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 7 contexts produced a large quantity of identifiable mammal bone fragments (NISP = 1,877). This phase continues the trend for increasing sheep/goat representation and a corresponding decrease in cattle fragments whilst pig maintains its low representation. Other domestic species present are goat, dog, cat and horse. The only wild species present are red deer and a number of fragments of Cetacea not identifiable to species.

The >10mm sample (*n*=695) of identifiable fish bone fragments is somewhat smaller than those of the previous three phases but the <10mm sample is larger, comprising 1,720 identifiable fragments (total *n*=2,415). Gadoid fish continue to make up the bulk of the >10mm assemblage (95%). For the first time, hake (9%) is more numerous than pollack (7%) and turbot and megrim are amongst the trace taxa. Herring continue to dominate the <10mm assemblage (93%), and bull rout is again present.

Wood charcoal

P. Austin

There was a greater quantity of Larch/Spruce wood used in hearth 205, along with other tree taxa, than in any of the other hearths, suggesting that its fire was fuelled predominantly by wood rather than peat. Whilst Heather may not have been the principal fuel component in the

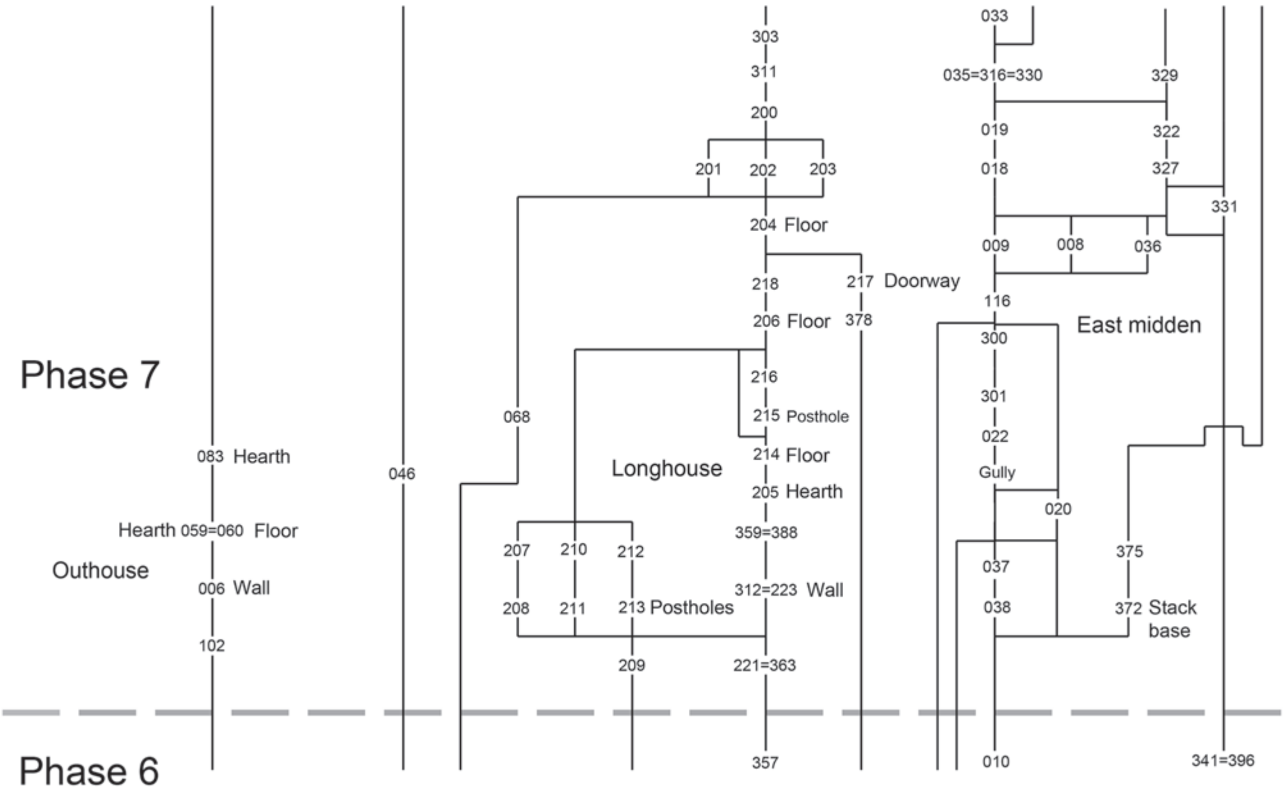


Figure 9.24. Stratigraphic matrix of contexts in phase 7

longhouse, all the fragments identified from the hearth (059) of the outhouse were identified as Heather, indicating that peat was burned inside this building.

9.7 Overview

M. Parker Pearson

House 312 was built at some time after *cal AD 1105–1160* (*95% probability*; SUERC-4877) and was in use for a few decades or less until it was abandoned by *cal AD 1130–1190* (*95% probability*; SUERC-4872; see Chapter 24). It was the first dwelling to be built on this spot for perhaps as long as half a century or so, and its orientation was rotated from the north–south axis of all previous houses: this house was aligned east–west, with its doorway facing north. An outhouse was built on its south side, apparently sharing the longhouse's turf wall and entered from the east. We can only speculate on whether the settlement's inhabitants were descendants of the people who had lived in House 500, or whether they were newcomers taking over an abandoned farm.

The floors of the longhouse and its outhouse have yielded a mass of information about domestic activities. Cooking – on platters and in bowls, involving the use of green Stulaigh (Stuley) slate as lids or bases (see Chapter 16) – was carried out at the west end of the long central hearth. The accumulation of potting clay, flints for fire-lighting and animal bone fragments at this end of the hearth also indicates related activities here. In the northwestern corner of the house, hones and pumice stones indicate sharpening and abrading tasks, whilst the presence of knives and antler waste in the southwest suggests an area of craft-working. A whale bone beater or paddle was also found in the house interior.

The outhouse was heated by a small, informal fireplace on which peat was burned but not wood (see Chapter 21), in contrast to the longhouse hearth. Broken ceramic platters on the top of this hearth indicate that baked foods were cooked here, at least during the final use of this fireplace. The few tools from the outhouse floor – a socketed bone point, an iron needle and an antler tine – give some indication that this little building might have been used for crafts as well as storage. Remains of crustaceans against its west wall may derive from nets and other fishing equipment kept in here. *Spirorbis* fragments inside its doorway indicate that seaweed for fire-lighting may have been dried here.

When the house went out of use as a dwelling, there was a short period during which it was used as a latrine and perhaps a temporary shelter from the elements. A human coprolite from against the house's south wall indicates that it was not only used by dogs as House 500 had been. The uppermost floor layer (204) contained much faecal matter. Eventually the roof must have been removed, or fallen in, as did the walls, and the interior of the abandoned house filled with windblown sand (Figure 9.24).

10 The last longhouse: House 007 (phase 8), constructed *cal AD 1140–1205*

M. Parker Pearson and M. Brennand

with contributions by H. Smith, H. Manley, P. Marshall, C. Ellis, J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

10.1 The house and its deposits

M. Parker Pearson and M. Brennand

After House 312 was abandoned, we see a break in the dwelling sequence at Cille Pheadair. The ruins of House 312 filled with tumbled masonry, rubbish and windblown sand so that nothing remained of this structure on the surface. This process of decay might have happened very quickly, within a few weeks or months, but this material filling the ruined house may also represent a rather longer period of abandonment – of seasons or years – before House 007 was built on almost the same spot (Figure 10.1). In contrast, the outhouse (006) did not fall into decay: it was renovated and retained into phase 8 (Figure 10.2).

House 312 was abandoned: its last inhabitants either died or moved out, perhaps temporarily into Outhouse 006, or into an unidentified house at another location. The next house built at Cille Pheadair, House 007, was oriented north–south and constructed on top of and into the eastern half of House 312 (Figure 10.1). It may be that an entirely new family moved onto the abandoned plot and built their new dwelling. The building of House 007 on top of the remains of House 312 may be meaningful. The placing of House 007's hearth (100) through the doorway of House 312 could be fortuitous but it may also be a deliberate act, serving to mark a continuity between households. In addition, the east wall of House 312 was incorporated into the long east wall of House 007.

Construction features

House 007 was 6.90m long north–south and 3.15m wide east–west, with two opposed doorways, 0.60m wide, in the northern halves of the east and west walls, 1.40m and 1.60m from the north wall (Figures 10.3–10.4). This is the only house at Cille Pheadair with a west-facing doorway, facing into the prevailing Atlantic weather system.

The house's beach-cobble walls and its corners were relatively straight, except for the curved dogleg of its southeast corner which incorporated the earlier east wall of House 312 (Figures 10.1, 10.5). The stone walls of House 007 were visible on the surface of the site immediately after machining and initial cleaning in the first season of excavation.

The construction cut (098) for the house's walls (007) was filled with a series of brown (099), grey to dark grey (113) and dark grey-black (361) sands. A series of make-up layers were deposited within the south end of the house trench before the floor was laid: 055 (a light brown sand on the west side) and 058 (a mottled beige sand on the east side; Figure 10.6), both covered by a strip of fine white sand (072), probably windblown. A very thin black charcoal layer (095) also lay over 058 at the south end. In the northwest corner of the house, a redeposited heap of peat ash (097) appeared to extend underneath the wall of House 007.

The gully surrounding House 007

A soakaway gully (039 and 050=111) encircled the house to the north, east and south; in the east the gully did not cross the entrance passage, and in the northwest, the gully stopped at the western entrance passage (Figures 10.2, 10.7–10.8). The windblown sand filling the abandoned House 312 to the west was not cut by the gully. Presumably the soft fills of House 312 did not require drainage and so a gully was not needed around this part of the house.

House 007 and its passageway entrances were, therefore, surrounded on all but the west side by two steep-sided gullies, one to the north (039; Figure 10.6) and one to the south (050). Both gullies were about 0.30m deep and 0.60m–0.80m wide, and contained homogeneous stone, sand and shell fills (054 [north] and 049 [south]). A band

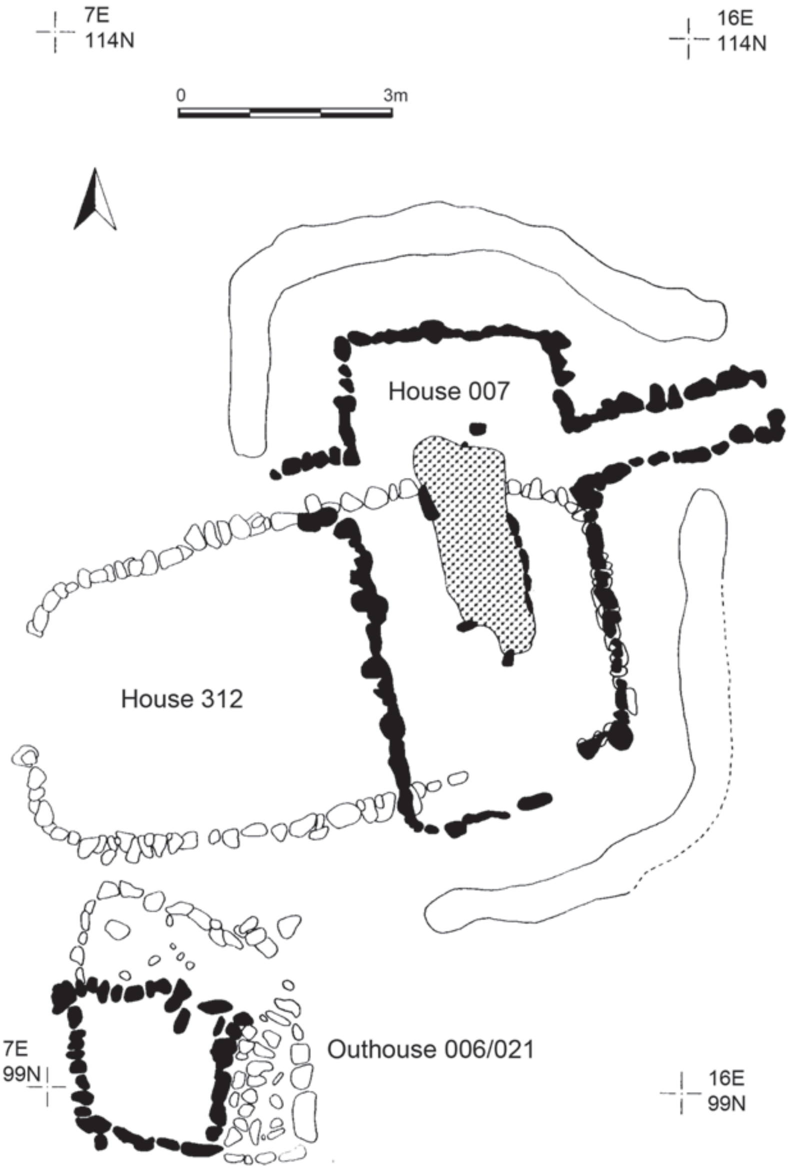


Figure 10.1. Simplified plan of House 007 in phase 8

of orange-brown sand (305) was sandwiched within 054. Above 054, a darker soil (034) had slumped into the top of the northern gully (039). Layer 034 might have derived from the adjacent midden. The steep sides and sandy fill of the gully indicate that it was filled soon after digging out, presumably to serve as a soakaway for roof runoff.

The southern stretch of the gully (050, cut into sand 046 and filled with 049) followed the line of the house wall but at a distance of 1.10m–1.20m from it. Its west end was located near the house's southwest corner. The length of the western entrance passage (1.10m) and the distance of these two soakaways or eavesdrip gullies (039, 050) from the interior wall (1.20m) provide a useful indication that the external edge of House 007's turf walls was 1.10m–1.20m from the interior stone wall face (see 'Abandonment layers' below for discussion of wall construction).

The southern gully (050) was visible on the east side of House 007 as a steep-sided gully (111=050) running on a north–south alignment from a butt end 0.40m to the south of the eastern entrance passage, alongside the eastern wall of House 007. The gully was filled with three consecutive layers; a light brown sand (224) with shell and large stone inclusions, a dark brown compact organic sand (115), and a loose light brown sand (112; Figure 10.6).

The floor of House 007

The rectangular hearth (layer 065 over and around 064, within cut 100) was 2.86m long and 1.16m wide, delineated by stone uprights (066) on parts of its south and east sides. The hearth was located in the centre of the house, but slightly closer to the north wall and west door (Figures 10.2, 10.6, 10.8). A charred *Avena* sp. grain from layer 065 produced a radiocarbon date of cal AD 1040–1280 at 95.4% confidence (SUERC-4898; 855±40 BP), and a charred grain of *Hordeum vulgare* from 064, below, gave a date

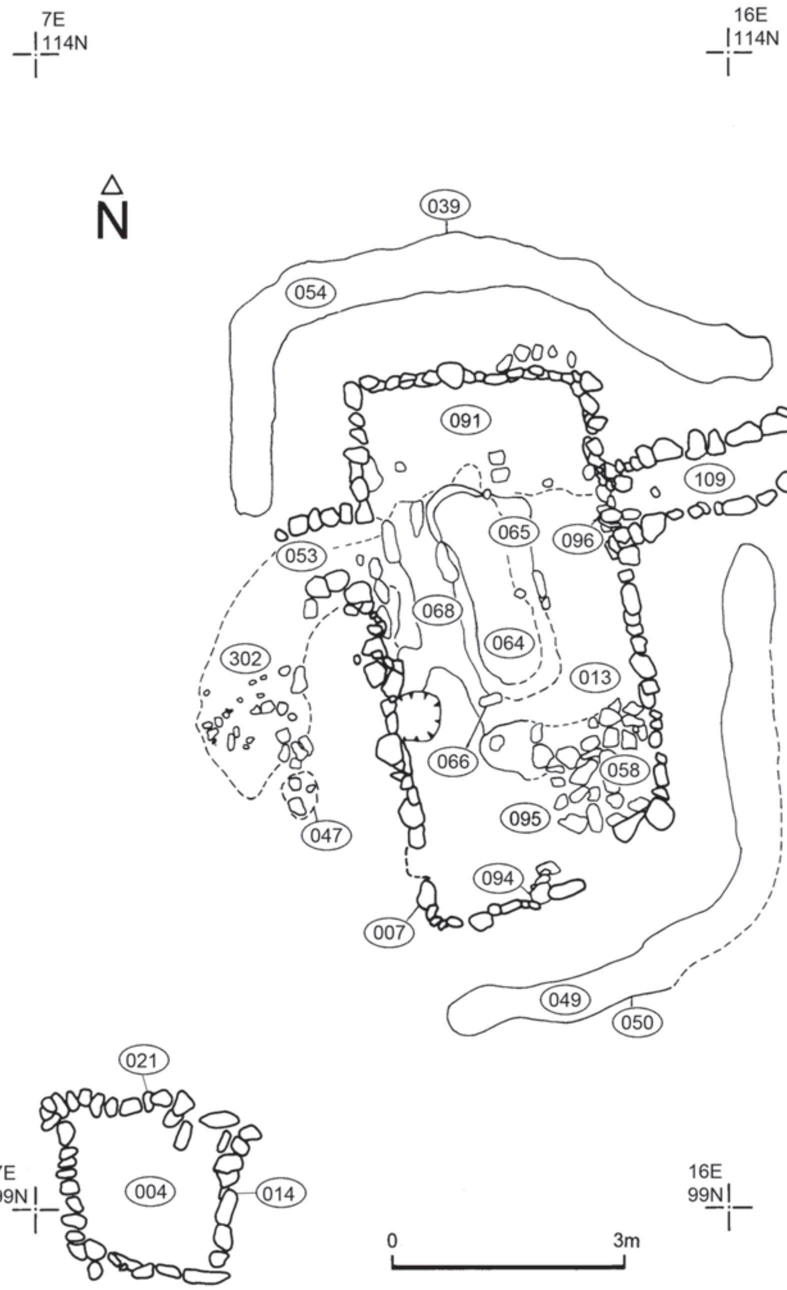


Figure 10.2. Plan of House 007 and its associated outhouse (006) and other phase 8 features

of cal AD 1185–1290 at 95% probability (SUERC-4897; 785±35 BP).

The house had one floor layer which was sub-divided into numerous patches on the basis of minor variations in their composition (013=063, 092=077, 091, 093, 053 and hearth 064 and 065; Figures 10.2, 10.8). The floor layer was thickest around the northern end of the dwelling but could not be seen clearly or even found in its southern end, which had been damaged by stone-robbing in the southeast corner. In the southwest corner the floor had been destroyed by later activity. In the centre of the south wall, four stones were stacked flat (094) on top of a thin charcoal layer (095; Figure 10.2); one of these stones had been roughly hewn. This stone stack (094) may have been part of the structure of House 007 or may be part of the subsequent hut constructed on top of the southwest corner of House 007 in phase 9 (Hut 031; see Chapter 11).

Within the middle of the southern end of House 007 was a small patch of fine white sand (072), lying under a localized dark brown layer (092=077) which is probably all that survives of the floor in this end of the house (Figure 10.8).

The floor contexts within House 007 were almost clean of sherds and larger bone fragments. The very few artefacts were a fragment of bone comb, a bone spindle whorl, a polished pebble and just five iron artefacts (Table 10.1).

The distribution of these is discussed in section 10.3 below. This paucity of materials might have been accentuated by the removal of floor surfaces in the house's southwest and northeast corners in the subsequent phase of

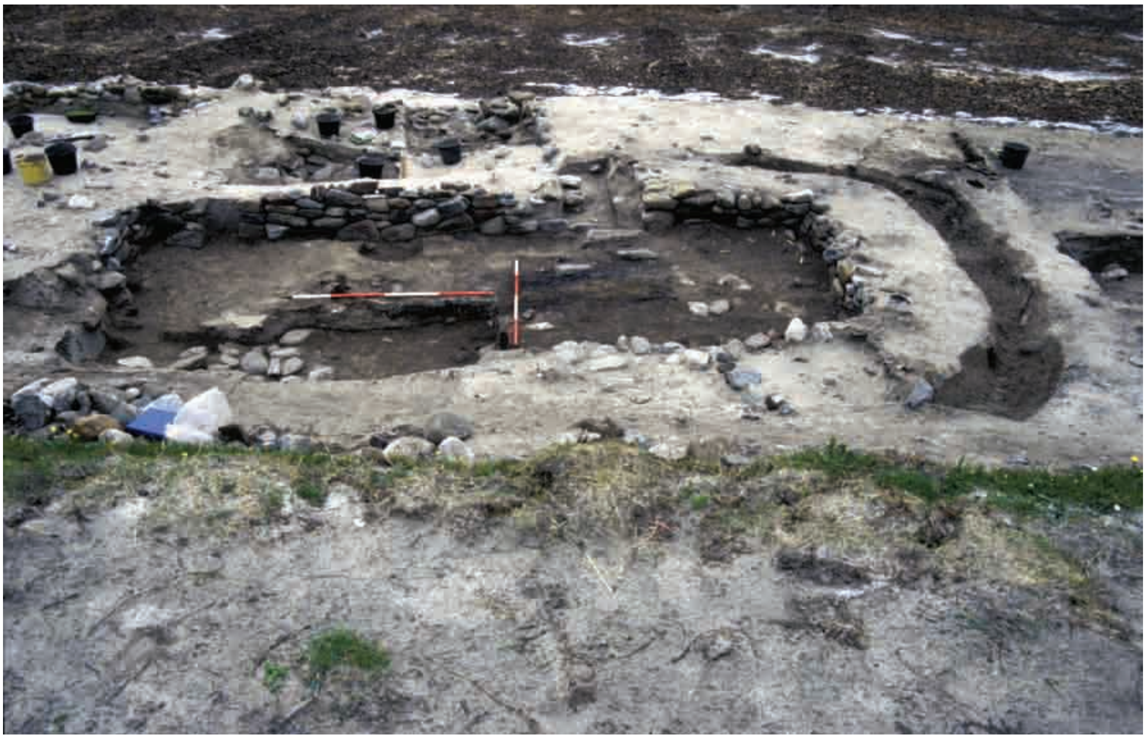


Figure 10.3. House 007 excavated to its floor layers, viewed from the east

Figure 10.4. House 007 during excavation by Mark Brennand (standing) and John Raven (foreground), viewed from the south

activity, when two small huts were inserted into the ruins of House 007 (see Chapter 11).

The ephemeral nature of the floor in the southern half of the house is notable, especially in contrast to the thick floors in this area of the interior of the earlier longhouses on the site. The position of the hearth, so close to the doorways, is also unusual in comparison to the earlier houses. The hearth of House 007 would have restricted movement into the house, ruling out the possibility of the end of the house (north of the doorways) having been used as a byre. Curiously, the ephemeral floor is in striking contrast to the formal (if partial) rectangular stone setting around the hearth, a feature that was not found in any of the earlier houses.

Figure 10.5. House 007 during excavation, viewed from the southwest

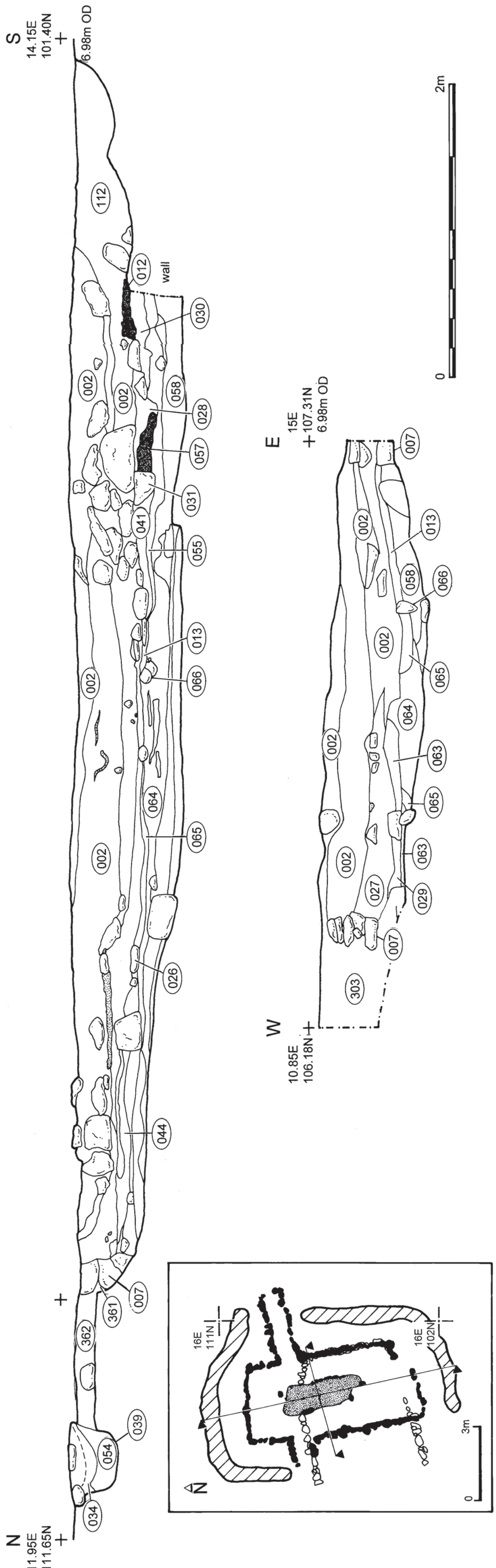


Figure 10.6. Sections through the floors and fills of House 007, and through the phase 9 huts

The west doorway and the pathway

On the west side of the house, access was gained to the outside through a doorway whose multi-lensed floor (053) sloped gently upwards towards ground level over a distance of 1.45m. From here, a hollow pathway (marked by two discontinuous fills of grey-brown sand; 302 and 310) led southwards towards Outhouse 006 (Figures 10.2–10.4). Leading northwards from the west doorway for two metres was a similar fill of light grey-brown sand (355). Layers 047=048 and 051 were upper fills, of mottled grey-brown and white sand and of redeposited peat ash, within the pathway to the outhouse.

The east doorway

The east doorway led into a passageway that was similar to the west entrance, in that it too was sunk below ground level. This elongated entrance passage ran for 2.90m from the wall of House 007 towards the eastern edge of the settlement mound (Figure 10.9). Here the deposits dropped away on a steep gradient, marking the easternmost edge of the mound in its final phases. The passage thus led out of the house and eastwards off the settlement mound towards the farmstead's fields or machair pasture.

Figure 10.7. The eavesdrip gully outside the northwest corner of the house, viewed from the west

The passage walls of this eastern entrance were contemporary with the walls of House 007 and had been inserted into the same construction cut (098). The walls survived to two or three courses in height. A sequence of six layers filled the passageway (Figure 10.10). The lowest were 109 (a light red-brown sand that ended before the passageway's west end) under 110 (a mottled yellow and dark brown sand). This was covered by a definite floor layer, a dark brown to black organic sand (108=101) with charcoal and shell inclusions. From passage floor 108 came a copper-alloy strip bearing a casting of a crouching lion (Table 10.1). Layers 109 and 110 appear to be construction layers, on top of which the floor (108=101) was laid, although they could possibly belong to phase 7 or even earlier.

A blocking stone (096) lay over both the earliest surviving floor (013) of the house and the two stones of the east doorway's step or threshold (Figure 10.2; it is visible in Figure 10.5). These stones prevented the accumulation of deposits within the passageway from spreading into the inside of the house, and created a step down into the house from the passageway. A localized floor layer of dark grey sand (093) accumulated inside the house against this blocking, indicating that the house was still in use after stone 096 was laid. The east passageway was subsequently blocked off with a wall at some point during the house's occupation.

Outside in the passageway, three layers of fill accumulated after it was blocked off. First was a light grey-brown sand (107), covered by a dark grey-brown sand (106) and topped by a yellow windblown sand (103).

Abandonment layers

As well as the three abandonment layers in the east passageway of House 007, there were two (003 and 005) within the fill of the outhouse (see below). The situation inside House 007 itself was far more complex because the house was not abandoned entirely, being occupied in a state of disrepair by two small huts (phase 9 of the site's occupation; see Chapter 11).

The many stones filling the abandoned ruins by the end of phase 9 (see Figure 11.7) probably derive not only from these phase 9 huts but also from the interior walls of House 007 belonging to phase 8.

There were about 500 wall stones in the house's fills subsequent to phase 8. Taking into account the likelihood of later stone-robbing (*i.e.* stones being removed entirely from the site), this quantity of building material suggests that the inner wall of House 007 stood at least another four courses higher than it did at the time of excavation. There is no trace of an outer wall as marked either by stones or by decayed turf. We suspect that, as seen in House 500 (see Chapter 6), there was once a turf wall to House 007 but it probably never had an outer skin or wall of stone. Although the turf wall was revetted with a stone wall internally, the house would have appeared from the outside to have been built entirely of turf.

10.2 Outhouse 006 (stages III/IV and V) and its deposits

M. Parker Pearson and M. Brennand

The stone walls of the final stage of Outhouse 006 were, like House 007's outline, visible on the surface of the site after machining and cleaning. Stages I and II of Outhouse 006 were built in phase 7 (see Chapter 9) and the structure was modified several times during phase 8, apparently going out of use before phase 9 but this cannot be proven.

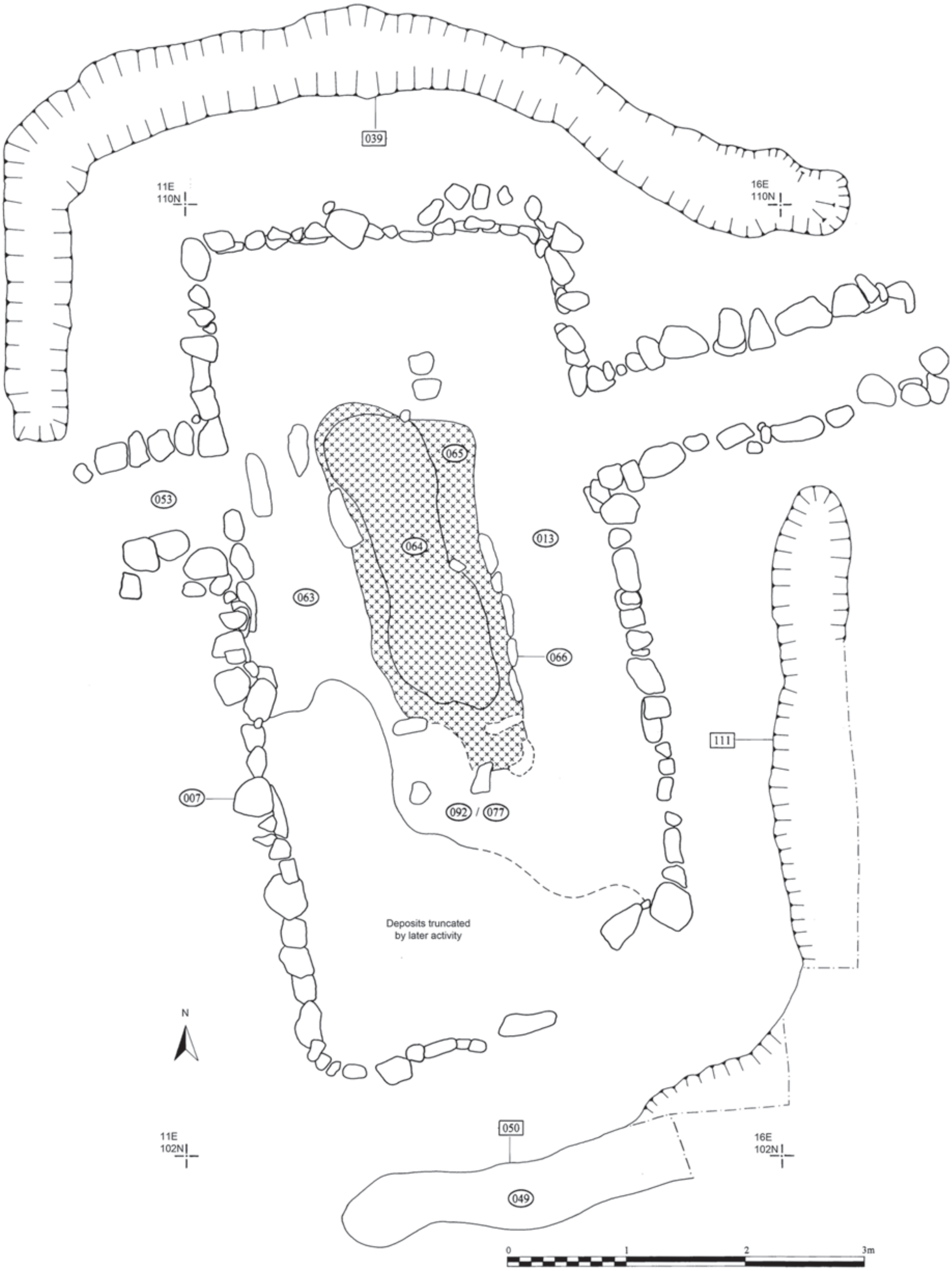


Figure 10.8. Plan of House 007 with its hearth and eavesdrip gully

Construction and redesign

After its construction and initial use in phase 7, Outhouse 006's floor plan was twice (or three times) redesigned, each time becoming smaller than before (Figure 10.11). Stage III involved the construction of a new north wall (021 and its fill 052), constructed inside the previous wall. During stage III, the outhouse's doorway thus moved so that it no longer faced east but north, towards House 007's west doorway. In either stage III or stage IV, a short length of wall (016 and its fill 017) was constructed on the southern 1.60m of the east side of the outhouse, which diminished the size of the interior to an area measuring only 2.36m

Figure 10.9. The blocked-off east passageway from House 007, viewed from the west

east–west. It is possible that the two walls (021 and 016) were constructed at the same time.

During stage V, a new east wall (014 and its fill 015) was constructed. The interior of the outhouse now measured just 1.70m east–west by 1.80m north–south. This fifth stage also incorporated a narrow doorway formed of a pair of stone uprights, 0.36m apart in the east end of its north side. If the stone uprights were beneath a step rather than being the portals of the door, the doorway would have been a more feasible 0.64m wide.

The outhouse floor layer

The complexity of this construction sequence was not mirrored by the floor deposits, which consisted of a thin, uneven band of slightly brown, organic sand (004), covered by two layers of windblown sand (003, 005; Figure 10.12). Finds from this phase 8 floor layer (004) are not attributable to any specific construction stage. The finds assemblage consists of a fragment of a club-headed copper-alloy pin, a very small comb fragment, a bone awl, a steatite spindle whorl, just two iron artefacts, a piece of slag, a large sherd of platter ware, two flint flakes, a hammerstone and a concave-worn stone; its wear might have been caused by feet rather than by grinding.

The small size of Outhouse 006 suggests that it was an ancillary building rather than a true dwelling. The lack of a hearth during phase 8 and the ephemeral floor surface (004) support this interpretation, although the thinness of the floor might have been due to regular sweeping. A chopping-block made out of a whale vertebra was found just outside the entrance of Outhouse 006 within the windblown sand covering the site, and probably belongs to this phase.

10.3 The spatial patterning of debris within the house and outhouse floors

M. Parker Pearson, H. Smith, H. Manley and P. Marshall

House 007 was the first large house to have its floor sampled and the methodology needed to excavate such complex and ephemeral deposits was only refined during its excavation. The first floor layer to be discovered at Cille Pheadair – encountered in the very first days of excavation – was the thin layer (013) in House 007's southeast quadrant; this quadrant of 013 was not excavated by grid, and therefore appears as a void on the distribution plots for this phase.

We identified ten different contexts making up the floor layer of House 007. During excavation, we attempted to excavate each of these ten separate floor contexts using a unique grid for each context. This methodology proved unsatisfactory, so after this all floors at Cille Pheadair were excavated using a single sampling grid covering the whole floor. Thus in subsequent excavations only major floor layers were distinguished from each other during the sampling (*e.g.* floors 204, 206 and 214 in House 312 in phase 7). For House 007, the finds from the ten different contexts that together make up the floor layer have all been plotted as a single floor.

The quantities of artefacts and other debris from the floor layers of House 007 are far lower than those from the outhouse floor. Since they are so few within House 007, and given the problems with the experimental sampling methodology, artefacts from the floor contexts are best treated within a holistic consideration of these floor layers as a single entity which may be compared to the floor (004) of the outhouse.

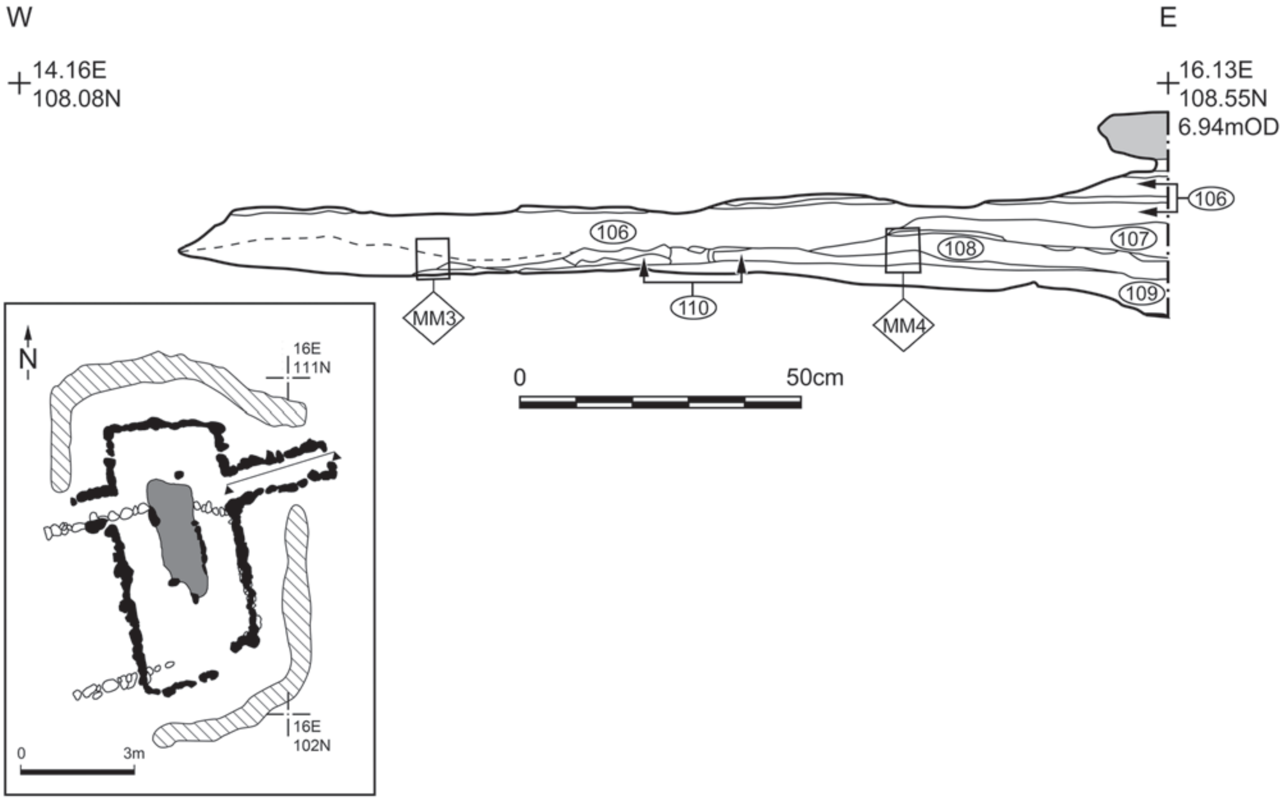


Figure 10.10. Section through the blocked-off east passageway of House 007

The problems of sampling House 007's floor layers were further compounded by the degree of phase 9 disturbance at the house's south end (see Figure 10.8). In spite of this truncation and disturbance of the deposits, there was enough floor area surviving in this area to indicate that there had never been any concentrations of sherds, bones and artefacts in the south end of this house.

The deep build-up of House 007's hearth deposits to 0.16m was wholly at odds with the very small quantities of material on the house floor. In fact, in contrast to all previous house floors, House 007's interior was kept so well swept that only a very limited *in situ* floor layer built up. As a result, far fewer artefacts and other micro-debris accumulated in this longhouse as opposed to earlier ones. The tiny space of the outhouse floor (004), however, was a veritable treasury compared to the low density of finds within House 007.

Total phosphorus

The results show high concentrations of over 3,000 ppm within the north–south hearth, with a distinct plume from the hearth into the northeast corner of the house (Figure 10.14). This plume suggests that the fire was raked out from this position. The west-facing doorway must have caused problems with draughts caused by the prevailing westerlies, which may explain why this plume was on the east side. Concentrations against the walls in the northern part of the house indicate sweeping debris.

Ceramics

Of the 34 sherds from House 007, just one of them (from the north end) was of platter ware. There was no particular concentration except in the northwest and northeast corners (Figure 10.13). Small fragments of pottery (<10mm) were most dense within the southern half of the hearth (Figure 10.14), suggesting that this is the part of the hearth where cooking mostly took place.

Of the 281 sherds from the outhouse floor, most were swept up against the southwest corner as a single deposit (Figure 10.13). The southeast area of the floor was largely devoid of sherds. As with outhouse floor 060 in phase 7, nearly all of this pottery was platter ware (with just 18 exceptions). In these stages of the outhouse's use, however, there was no hearth.

Animal bone fragments

Larger bone fragments (>10mm) were spread throughout House 007 with a slight concentration in the centre of the hearth (Figure 10.13). There were very few large bone fragments from the outhouse.

Of the mammal bone fragments <10mm, unburnt material was concentrated around the margins of the hearth and burnt material within its south end (Figure 10.14). Bones of small mammals were concentrated in the northern part of the house especially near the doorway (Figure 10.14). Bird bone was similarly in the north end of the house but with a concentration in the southern part

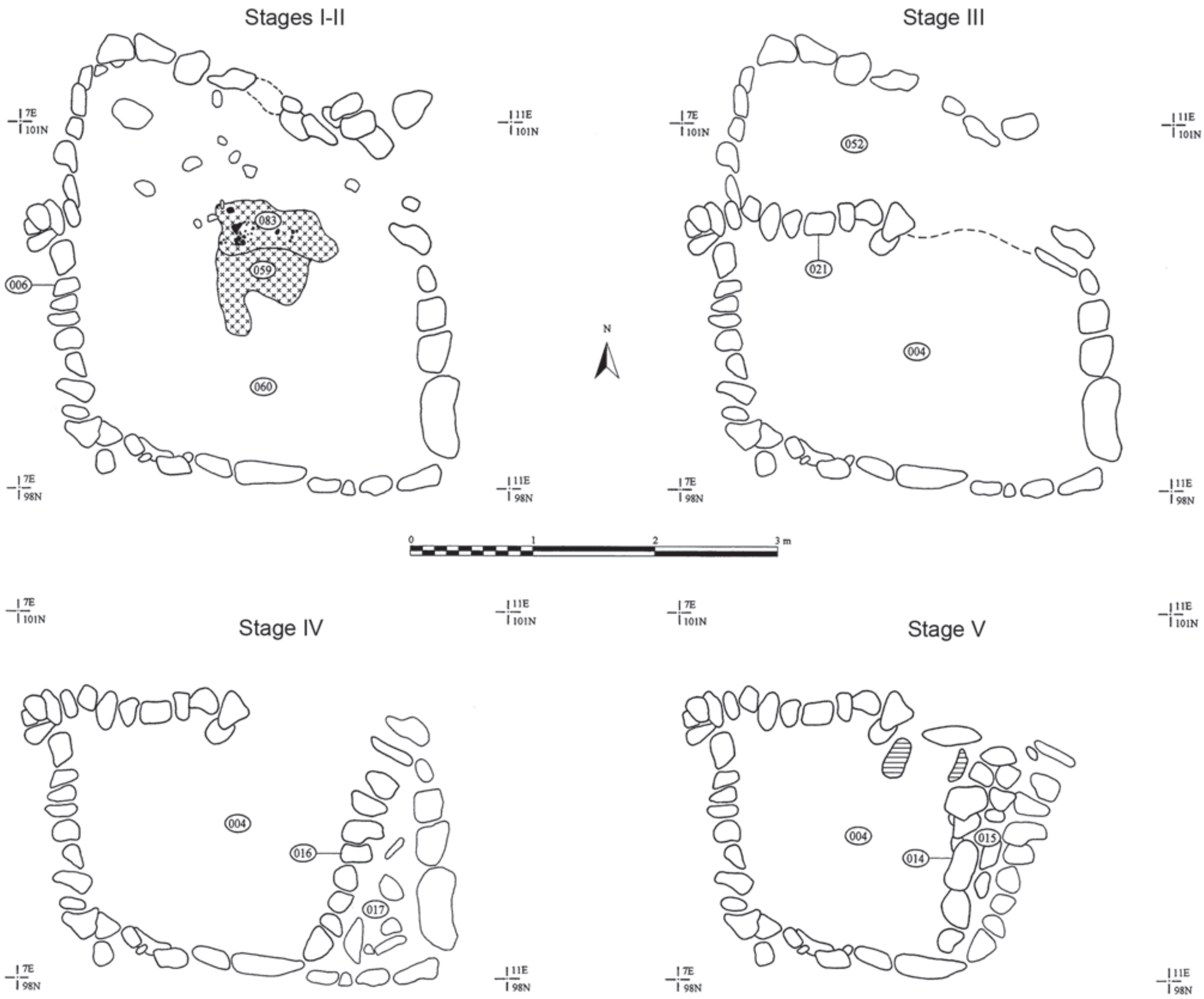


Figure 10.11. Plans of the five constructional stages of Outhouse 006

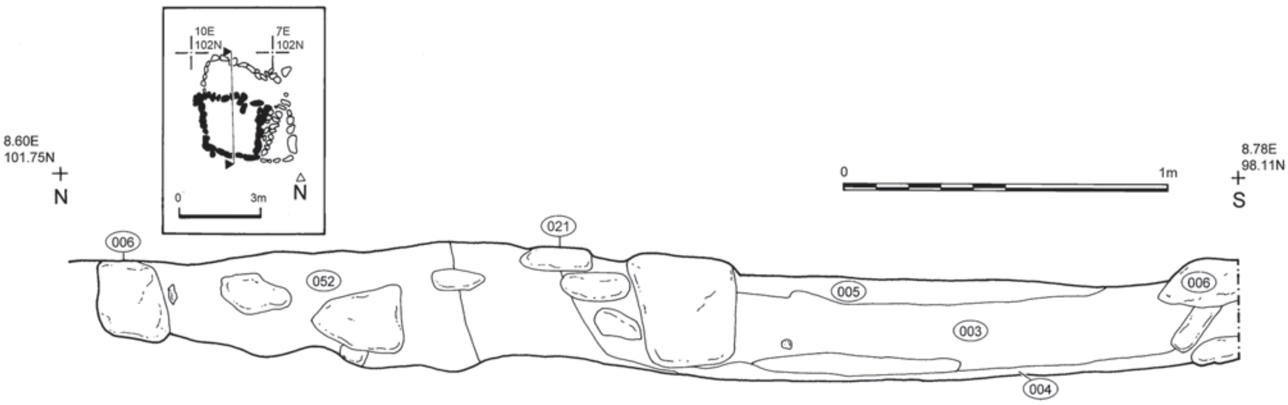


Figure 10.12. Section through Outhouse 006's floor (004), fill 052 and walls

of the hearth (Figure 10.14). Fish bones follow the same pattern except that, within the hearth, both burnt and unburnt material was within the north half (Figure 10.14).

There was a small concentration of crustacean remains at the north end of the hearth whereas marine shell was mostly beyond the north end of the hearth (Figure 10.14). There were eggshell concentrations on the west side of the hearth and in the northeast corner (Figure 10.14).

Table 10.1. Phase 8 non-ceramic artefacts by context and context type

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 8				
wall	007	1535	grinding stone	
	113	see Chap 15	iron rove	
construction	058	1044	bone spindle whorl	14.1
		2812	worked cat bone	14.3
		see Chap 15	iron rove, handle of box, nail	
gully fill	054	1049	worked antler tine	
			two fragments of worked cetacean bone	
		see Chap 15	iron needle or pin, clench nails, strip of roves, nail, unident fragment	
gully fill	305	1292	worked antler tine	14.4
gully fill	034	1271	fragment from a single-sided composite comb	13.5
		1286	worked antler tine	
		see Chap 15	iron clench nails, roves, nails	
hearth	065	see Chap 15	iron nail, strip	
floor	091	2484	fragment from a single-sided composite comb	13.5
		1140	bone spindle whorl	14.1
		see Chap 15	iron nail, possible tang	
floor	092	1195	polished black pebble	
floor	063	see Chap 15	iron rove	
floor	013	see Chap 15	iron plate fragment	
passageway floor	108	1790	copper-alloy quadruped figurine	13.15, 13.23
		2474	roe deer antler manufacturing wase	
		1494	steatite spindle whorl fragment	16.4
		see Chap 15	iron needle, nail	
passageway fill	106	see Chap 15	iron clench nail	
pathway fill	355	2481	bone point	
		see Chap 15	iron roves, nail, unident fragment	
pathway fill	047	1035	worked antler	14.5
pathway fill	051	1053	copper-alloy perforated disc	13.15
outhouse	004	1284	fragment from a single-sided composite comb	
		2487	club-headed copper-alloy stick pin fragment	13.15
		1002	bone awl	
		1021	worn threshold or grinding stone	16.1
		2532	stone pounder	16.2
		1017	steatite spindle whorl	16.4
		see Chap 15	iron rove, possible knife	
	003	see Chap 15	iron clench nail, rove, nails	
	052	1273	bone peg	14.1
		see Chap 15	iron nail	
	017	1275	bone awl	14.2
windblown sand	U/S	1037	whale bone chopping-block or mortar	14.6

Stone

Worked flint

The greatest concentration of flints was at the south end of the hearth and consisted of four flakes and a strike-a-light (Figure 10.13). A further four flakes close to the east wall and against the north wall were probably deposited here during sweeping, as was a fifth (not shown in Figure 10.13) from the blocked east passageway. One flint flake was found in the outhouse.

Small chips of flint (<10mm) in House 007 were most common north of the hearth and in two small clusters along its west side (Figure 10.14).

Slate, pebbles and stone tools

Just one piece of green slate was found in House 007, against the north wall. Nor were there any pebbles at all from the floor of this house except for a highly polished, oblong, shiny black pebble identified as a 'worry stone'. This lay immediately to the south of the hearth. On the outhouse floor lay a hammerstone, the concave slab that may be a re-used threshold stone, and a steatite spindle whorl (Figure 10.13; Table 10.1).

Bone, antler and metal artefacts

There were very few iron artefacts in House 007 and Outhouse 006 (Figure 10.13), and a concentration of small fragments of iron (<10mm) between the hearth and the west doorway of House 007 (Figure 10.15). Bone and antler artefacts were also very few in number (Figure 10.13). A bone spindle whorl lay with a broken nail in the northeast corner, presumably swept there. On the west side of the hearth there was a rove and on the east a piece of an iron strip, a broken plate fragment and another broken nail. A single fragment of comb came from the north end of the house. From the outhouse floor came the head of a copper-alloy pin, a knife blade, a rove, a bone point (or awl) and a comb fragment.

Iron-smithing slag, fuel ash slag and hammerscale

Hammerscale was concentrated at the entrance to the blocked east doorway of House 007 (Figure 10.15), close to one of the few pieces of smithing slag from this phase (Figure 10.13). Fuel ash slag (<10mm) was, as expected, mostly in the southern part of the hearth (Figure 10.15). Almost all of the micro-debris distributions indicate that this was that part of the hearth used for cooking.

Spirorbis

Spirorbis fragments, both unburnt and burnt, were distributed throughout the house (Figure 10.15). The concentration inside the west doorway probably indicates the position of the fuel storage heap.

Coprolites

The house floor was very clean compared to most of the floors in the previous houses. Most coprolite fragments were concentrated in a very small area in the northeast, presumably swept into this corner (Figure 10.15).

Conclusion

The spatial patterning of debris within House 007 is best interpreted as evidence of domestic activity within this dwelling. Although quantities are small, there is a good range of items of the types found in earlier house floors. Their locations and densities can quite often be matched with those seen in the earlier buildings.

The occupants of House 007 vie with their predecessors in House 700 (phase 3) as the tidiest household at Cille Pheadair. The floor was evidently swept regularly, in the usual pattern of moving the debris from the near end (south end) towards the doorways. This probably explains why the floor layer in the south half was so thin and hard to see: it was thicker, stickier and blacker in the north – there was effectively no solid surface left in the southern part of the house.

Given the large quantity of sherds piled up against the north and west walls inside the outhouse, there seems to have been less concern to eject rubbish from this structure. There is no apparent hearth in the outhouse in this phase but there are large quantities of platter ware. If the outhouse was used as a bakehouse in this phase, it must have been thoroughly cleaned to remove all traces of a hearth.

The presence of a large comb fragment placed axially beyond the north end of the hearth in House 007 recalls the positioning of what were evidently closing deposits of combs and pins in previous Houses 700 and 500. In House 312, a bone cross pendant occupied this position at the end of the hearth, and no combs at all were found on that house's floor. So the comb fragment in House 007 is possibly a closing deposit harking back to an earlier tradition.

10.4 Soil micromorphology of the passageway into the house

C. Ellis

Samples MM3 and MM4

The sampled layers in the passageway comprise layers 109, 108=101, 107 and 106 (Figure 10.10). The lowermost layer (109) is a windblown sand with a few clasts of sandy peat/turf ash and wood ash. This is directly overlain by a mixed wood and peat/turf ash deposit; the survival of large acicular calcite crystals indicates minimal transportation and weathering. The incorporation of small fragments of bone indicates that this deposit is likely to have derived from the domestic hearth. Given the sharpness of the boundary between this unit and the underlying windblown sand, coupled with the survival of delicate crystals, it is likely that this unit was deliberately spread or dumped rather being aeolian in origin.

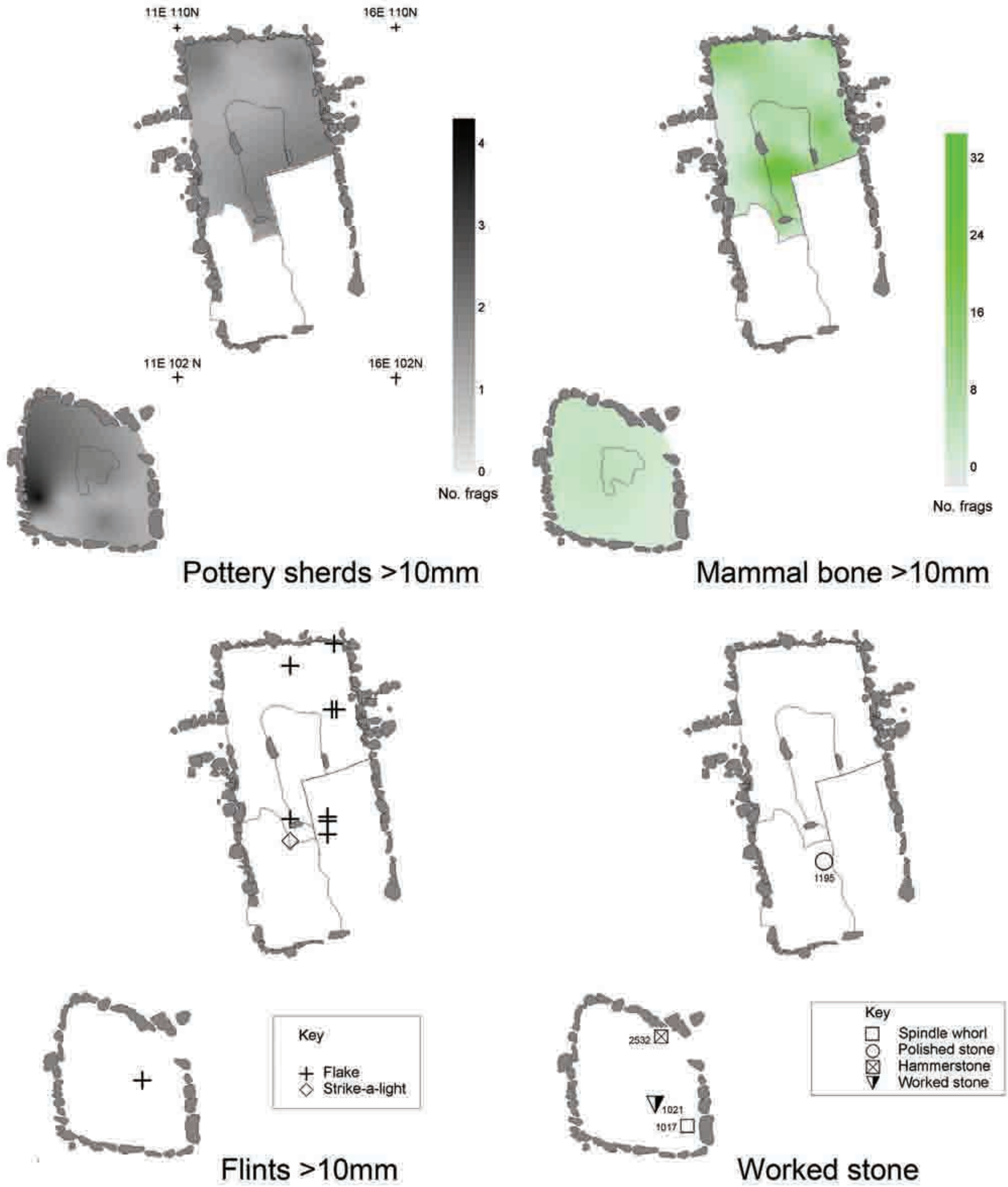


Figure 10.13. The distribution of pottery, mammal bone, flint, worked stone, metal artefacts, worked bone and antler, and ironworking slag in the floor of House 007 and floor 004 and fill 052 of Outhouse 006 (continued opposite)

The sharpness of the boundary between layers 108=101 and 107 either presents an instantaneous change in the type of material being deposited or, in this case more likely, a period of truncation, perhaps the sweeping of the area followed by the accumulation or spreading of a windblown sand with a sandy peat/turf ash component (107).

The boundary into layer 106 is diffuse, although there is a distinct increase in the amount of peat/turf ash amongst the windblown sand, with one fairly large fragment of burnt peat occurring within layer 106 (sample MM3). Three episodes of probable continuous accumulation are visible within 106; the central band contains less peat/turf ash than the upper and lower.

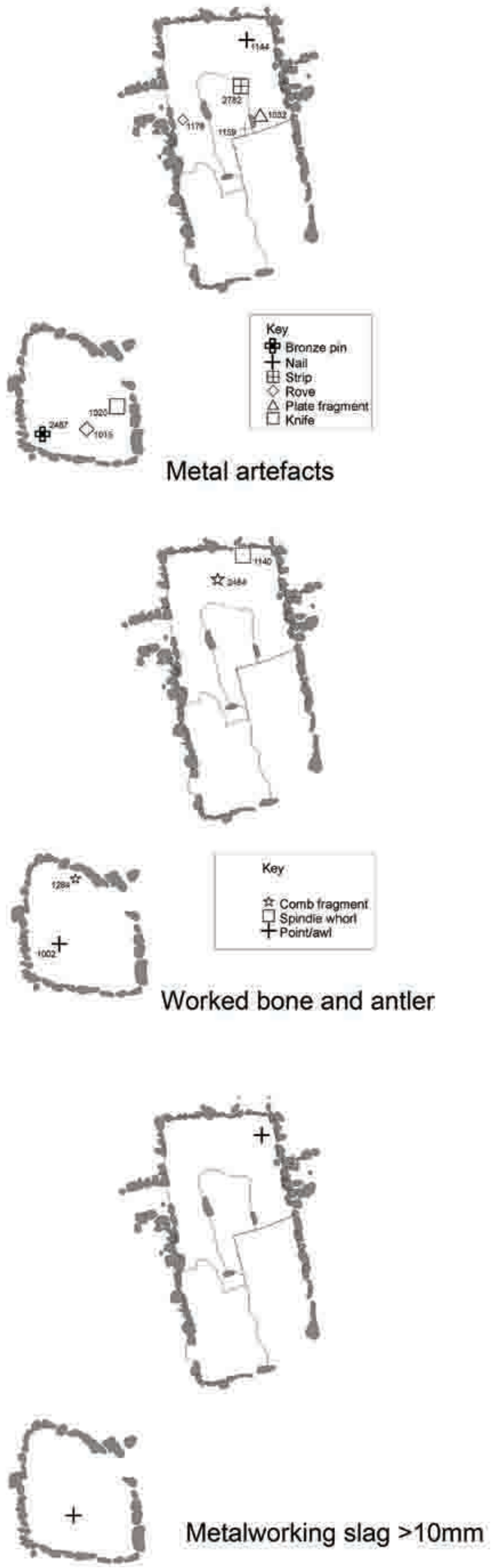


Figure 10.13. (continued from the previous page)

10.5 Artefacts and other remains from the house and associated deposits

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

The artefactual and environmental material from phase 8 derives from a more restricted series of contexts than in earlier phases. As well as the floors, there were:

- construction fills,
- exterior surfaces (footpaths),
- gully fills,
- abandonment layers.

There are no middens associated with the phase 8 occupation: these must have lain outside the excavation area, on the very edges of the mound.

Fragmentation

Despite the very large number of sherds in floor 004 of the outhouse, proportions of pottery to bone were generally less than in phase 7 (Figure 10.16). This may be because the assemblages for phase 8 derive mostly from house interiors rather than middens.

Construction layers

Within the construction fills, only contexts 361 and 113 produced large assemblages of pot and bone, and the assemblage from 058 is of medium size (Figure 10.17). Layers 113 and 058 have similar profiles, with small-sized bone fragments and small numbers of sherds. Layer 361 is dominated by medium-sized bone fragments and has no pottery.

Interior floors

Only 064 (the lower, central hearth deposit in the main house), 004 (outhouse floor) and 108 (main house's eastern passageway floor) produced large assemblages. The remainder are of medium size, except for the small assemblage from 063. The hearth layers 064 and 065 have similar profiles, dominated by medium-sized bone fragments and a few, large sherds. In the eastern passageway, layer 109 contained medium-sized bone fragments and no pottery. Layer 110, above 109, produced a similar pattern whilst floor 108 has medium-sized sherds.

Near the east doorway, the assemblage from layer 093 is primarily composed of small-sized bone fragments and a few sherds of medium-sized pottery. Within the northern sector of the house, layer 091 contained medium-sized bones, and half of the sherds were medium-sized. On the east side in the middle and southern part of the house, layer 013 contained large-sized bone fragments and a similarly high ratio of medium-sized sherds. The sherds from layer 063 are small-sized but more numerous than the few medium-sized bone fragments.

Exterior surfaces

Of the shallow fills outside the west doorway, only the

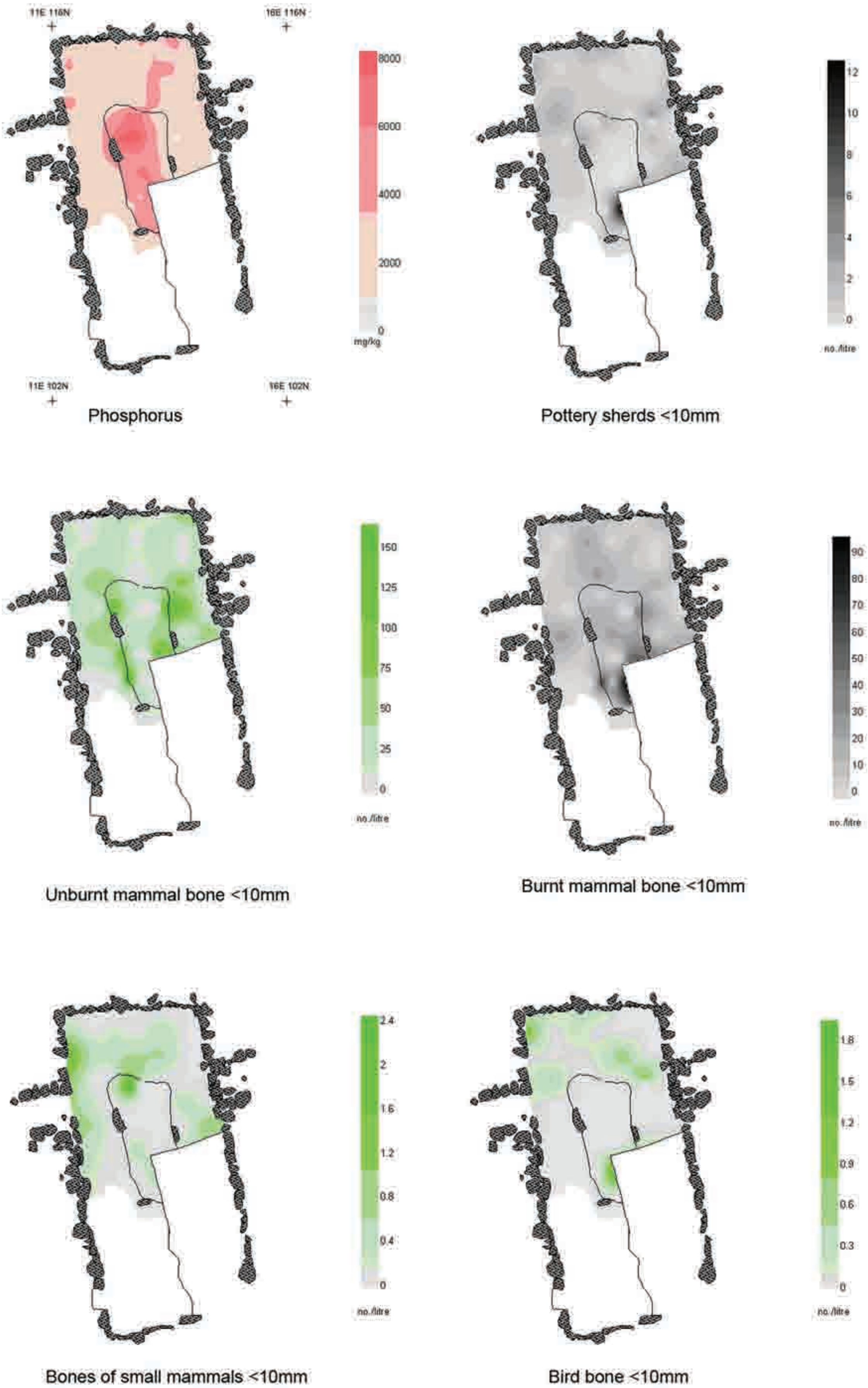


Figure 10.14. The distribution of total phosphorus levels, pottery, mammal bone, bird bone, fish bone, crab, marine molluscs, eggshell and flint in the floor in House 007 (continued opposite)

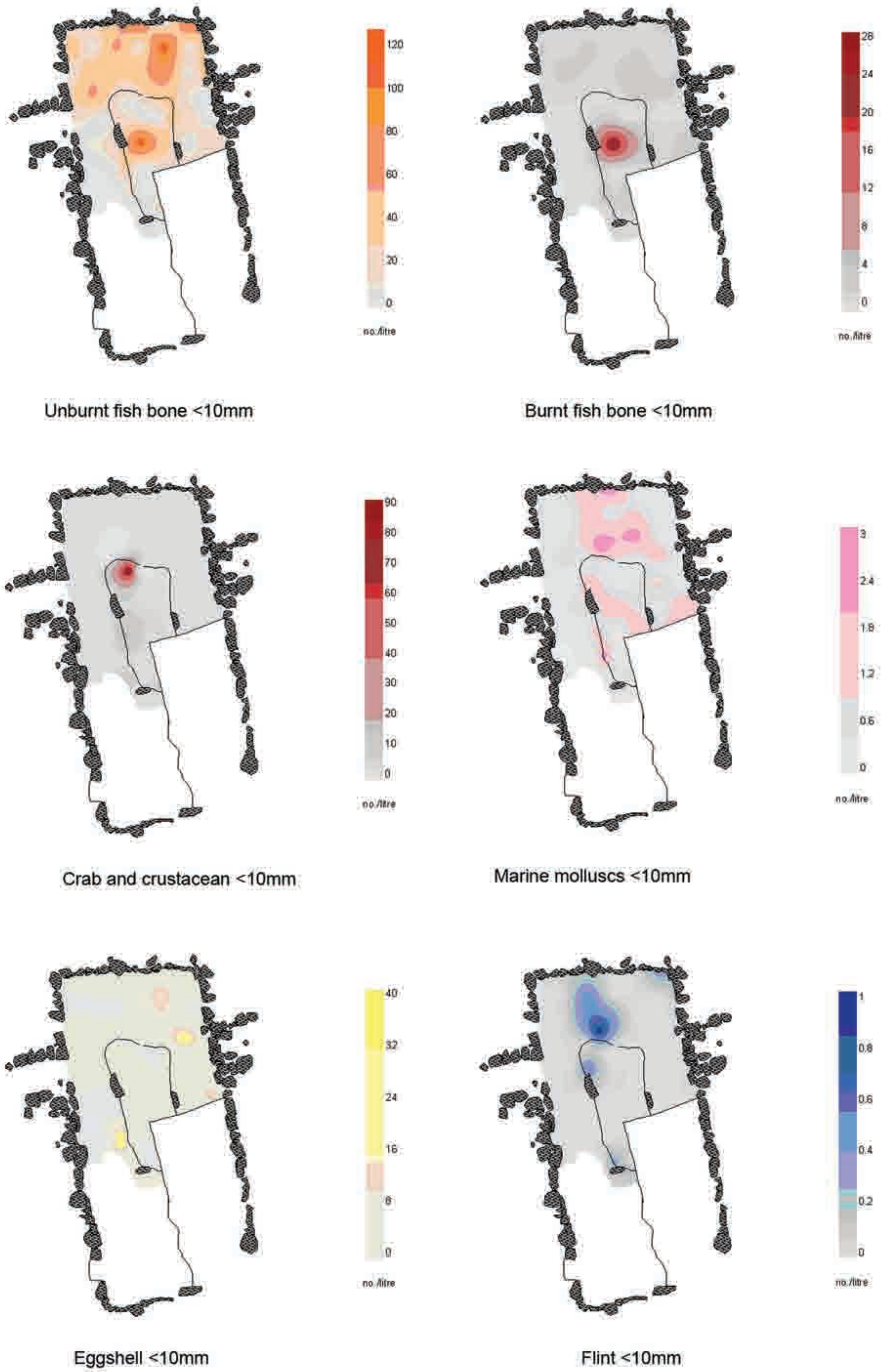


Figure 10.14. (continued from the previous page)

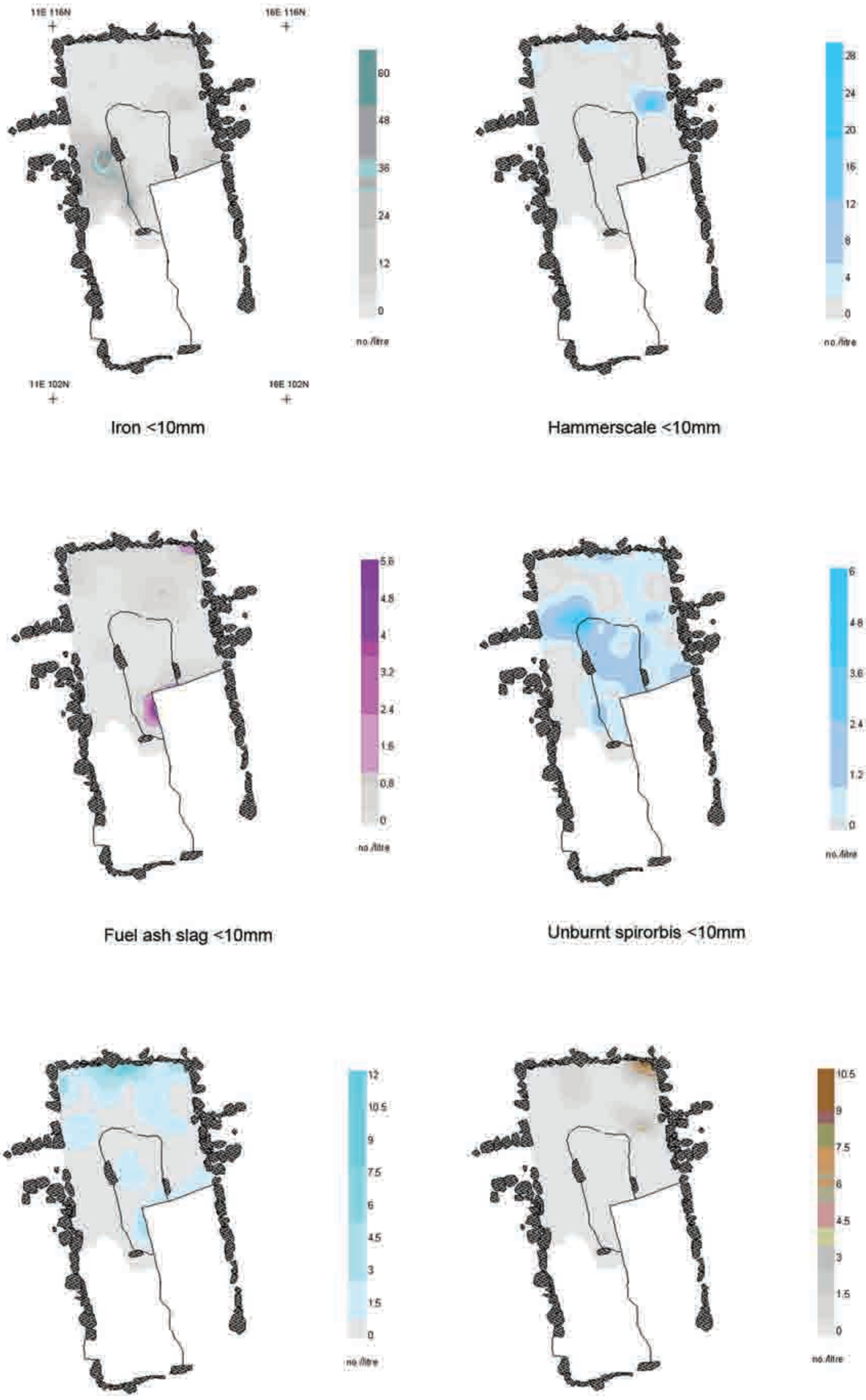


Figure 10.15. The distribution of iron, hammerscale, fuel ash slag, Spirorbis and coprolites in the floor of House 007

assemblage from context 355 is large enough for analysis: this large assemblage is dominated by small-sized bone and medium quantities of pottery. This material might well have derived from inside the longhouse, having been swept out of the door during house-cleaning.

The eavesdrip gully

There is a high degree of difference between the bone and ceramic assemblages from the fills of the north gully (039) and the south (050=111). Fills 105 and 112 in the southern gully produced large assemblages with very low proportions of pottery: fill 105 is characterized by medium-sized bone fragments and small to medium-sized sherds whilst 112 has small-sized bones and large sherds.

Conversely, layers 034 and 054 filling the gully north of the house contained large bone fragments with much higher ratios of small-sized sherds. This pattern equates with expected removal of household rubbish, with such rubbish being dumped in the eavesdrip gully just outside and round the corner from the doorway.

Abandonment layers

Quantities from these contexts are generally small and only layers 103, 106 and 107, fills that accumulated in the east passageway, produced assemblages of medium size. Layers 103 and 106 contained medium-sized bone fragments with a few large sherds, whilst layer 107 contained only medium-sized bone fragments and no pottery. Most of these deposits were windblown sand and there was no sign of any heaps of discarded rubbish that might be expected at the end of a house's life. The end of phase 8 was the end of longhouse-living on the site and it seems to have gone with a whimper, in terms of rubbish disposal.

Bone, antler and metal artefacts

In addition to the artefacts from the house floor, discussed above, a small number of unusual artefacts came from floor 108, in the eastern passageway: the copper-alloy lion strap-end, a fragment of steatite spindle whorl, a piece of worked roe deer antler, a broken iron needle and a near-complete nail (Table 10.1)

On the outside surfaces, the greatest quantity of artefacts (a bone point and four iron objects) came from layer 355, outside the western doorway. Footpath layer 051 produced a copper-alloy disc and footpath layer 047 contained a near-complete worked red deer antler.

In contrast to earlier phases, there was no indication in this phase of any special deposits within the buildings' construction fills. Material from contexts relating to construction consists of:

- a single rove from layer 113, a fill of the house's construction cut,
- a bone spindle whorl, a worked cat tibia, a fragment of an iron box handle, a rove and a nail from make-up layer 058,
- a grinding stone found within wall 007.

It seems that the last special deposition at Cille Pheadair was at the beginning of phase 7, during construction of that earlier longhouse, House 312. Thereafter there were no such offerings at either the beginning or the end of a house's life.

The contexts most productive of artefacts were 034, 054 and 305, filling the north section of the eavesdrip gully. As noted earlier, these fills contained large quantities of pottery and acted as mini-middens, collecting household waste removed from House 007.

- Layer 054 contained a worked antler tine, a broken iron pin or needle and eight further iron objects (mainly clench nails but including a strip of two roves yet to be used), and two pieces of worked cetacean bone.
- Further east along the gully, layer 305 contained a piece of worked antler tine.
- Above 054, layer 034 contained a comb fragment, another piece of worked antler tine, and ten iron artefacts (nails, clench nails and roves).

All of these items can be assumed to have arrived into the gully fills from within the house. As such, layers 034, 054 and 305 offer the best glimpse, other than the floor itself, of what activities went on inside.

On the south side of the house, away from the doorways, the eavesdrip gully's fills 105 and 115 contained no artefacts at all, but did produce single pieces of slag, hinting at the possibility that iron was being worked somewhere on the south side of the mound.

Sand layers 003, 017 and 052 in the outhouse contained a bone peg, a possible bone awl, three nails, a clench nail and a rove.

Ceramics

There was relatively little change in ceramic forms between phase 7 and phase 8. Absolute numbers of sherds are far lower than in earlier phases, preventing too much faith being placed in minor variations. However, almost all the pots were convex in form with steep base angles rather than curved or open with medium or shallow angles. Platters without grass-marking also become a sizeable proportion of the assemblage, whilst thin platters had virtually disappeared.

The patterns of use, as indicated by sooting, blackening and carbonized residues, are little different to what is seen in the phase 7 ceramic assemblage. The ratio of platter to other pots remains much the same at 42% and, as in phase 7, platter ware was frequent in the outhouse and almost absent in the house itself. However, if the sherds deposited in the gully derived from sweepings from the house, then the proportion of platter used in the house increases significantly, since in the gully fills 034 and 054 platter ware formed 38% of the sherds. Of the 40 sherds from the footpath fill 355 outside the west door, only five were platter fragments.

The average sherd weight (6g) in phase 8 is almost as low as in phase 7 and reflects the high breakage patterns of heat-damaged platters. Conjoins are fewer than at any time since phase 3 and, other than in Outhouse 006, are most common in the construction layers 113 and 058, with three joins in the pathway layer 047 and two in the gully fill 034.

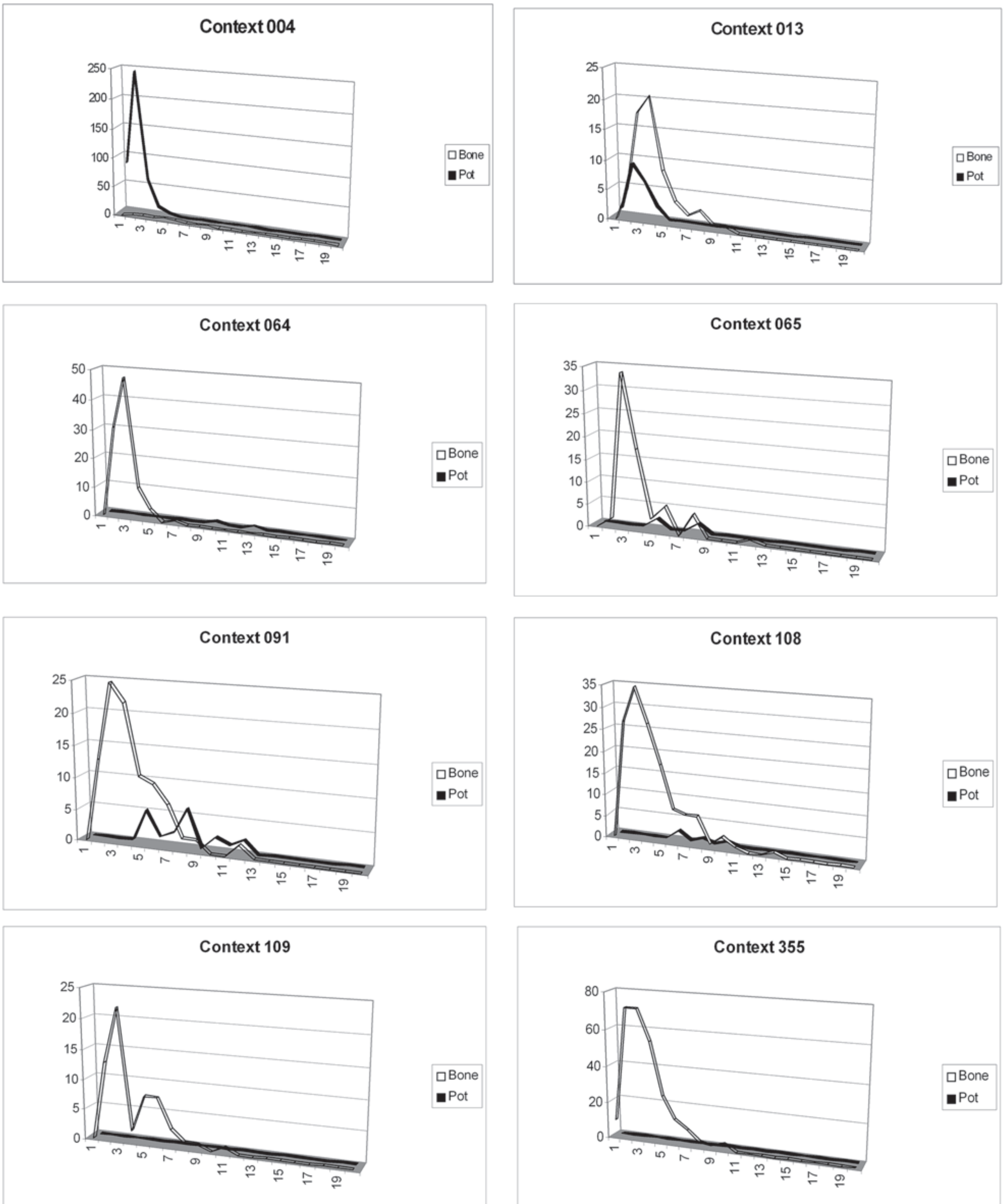


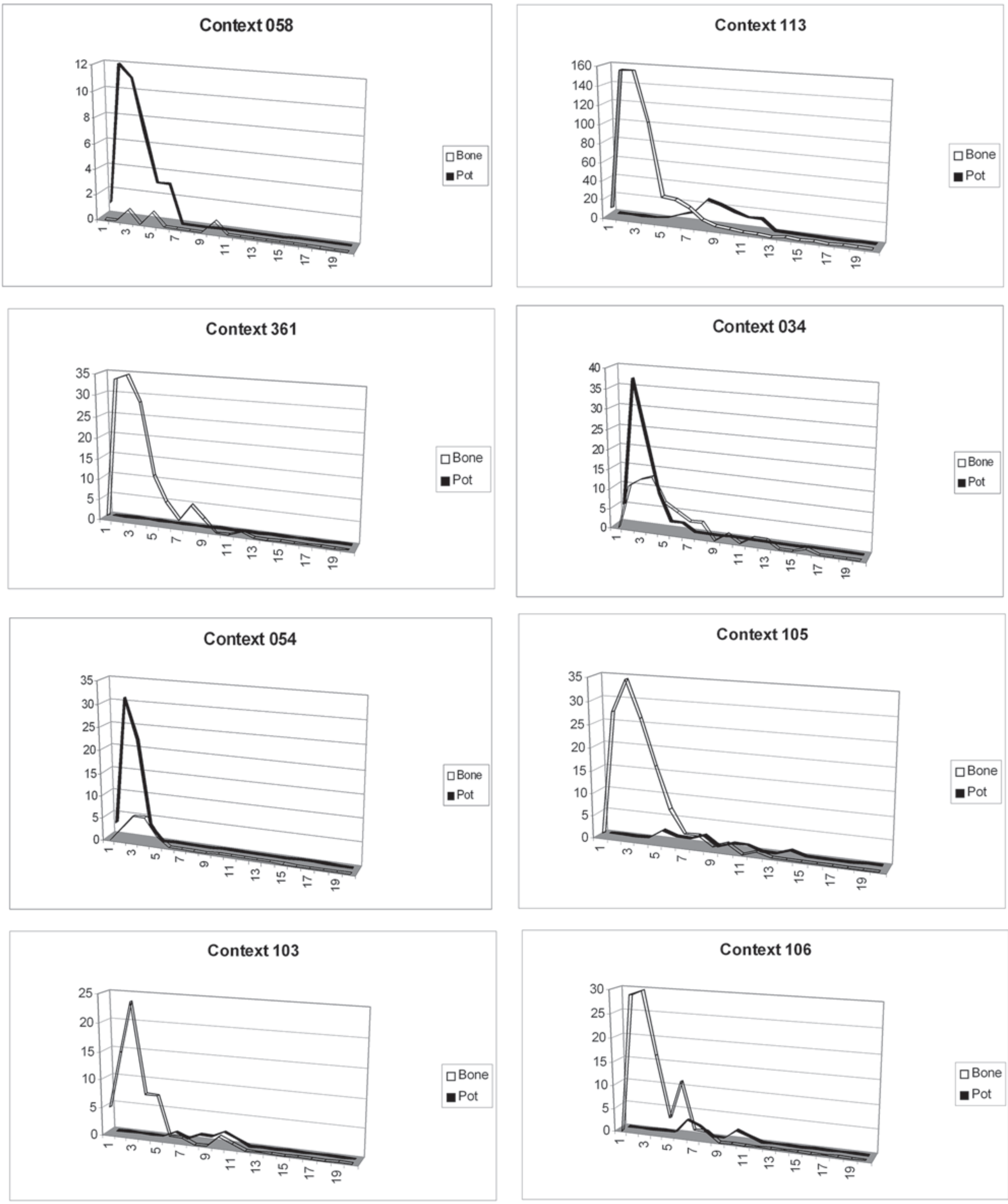
Figure 10.16. The fragmentation of sherds and bones in phase 8 floor layers (004, 013, 064, 065, 091, 108, 109) and exterior surface (355)

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 8 contexts produced a small assemblage of identifiable mammal bone fragments, with a NISP of only 516. Sheep/goat is still predominant, followed by cattle but the numbers of pig fragments rise slightly in comparison. Other domestic species present are dog, cat and horse. Red deer and seal are the only wild species present.

Phase 8 contexts produced only 28 fragments of identifiable fish bone >10mm in size, and a larger sample of 579 fragments <10mm in size (total n=607). All of the >10mm remains belong to gadoid fish, with cod continuing



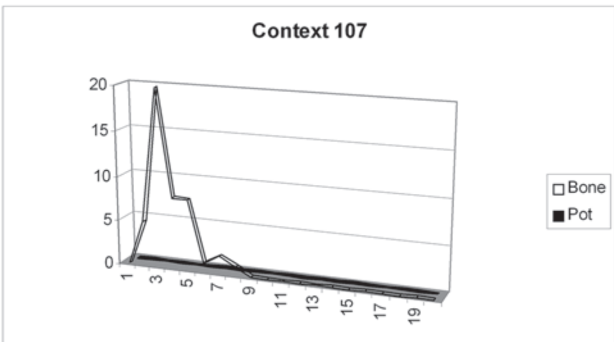


Figure 10.17. The fragmentation of sherds and bones in phase 8 construction layers (058, 113, 361), fills of the eavesdrip gully (034, 054, 105) and abandonment layers (103, 106, 107)

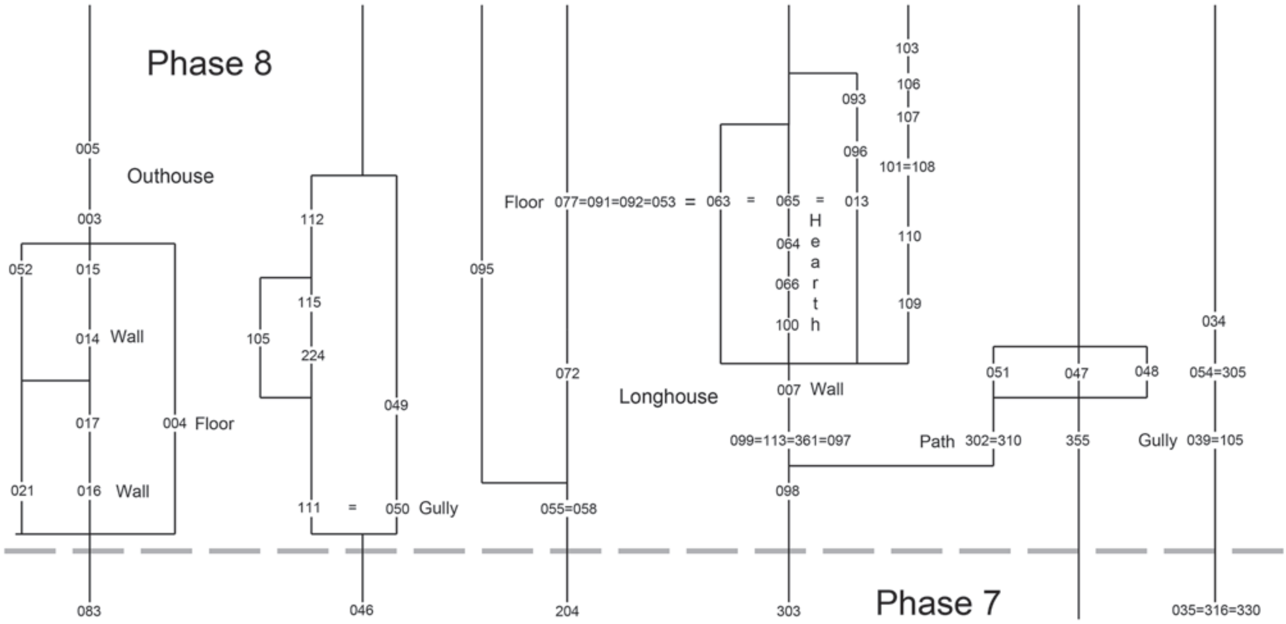


Figure 10.18. Stratigraphic matrix of contexts in phase 8

as the most numerous species. In the <10mm sample, herring are slightly less well represented (87%) than in most of the earlier phases. Eel comprises 4% of this material, higher than in any other phase.

Wood charcoal

P. Austin

Ten taxa were identified amongst the wood charcoal from phase 8 contexts. Heather is by far the most ubiquitous. Also present are Larch, Alder, Birch, Hazel, Larch/Spruce, Willow/Poplar, Oak and *Sorbus* sp. A single fragment of Elm – the only Elm identified in the assemblage as a whole – was identified from the floor of Outhouse 006.

10.6 Overview

M. Parker Pearson

House 007 was built in *cal AD 1140–1205* (*95% probability*), most likely in the third quarter of the twelfth century (*cal AD 1155–1185* [*68% probability*]). The gap between the abandonment of the previous house (House 312) and the construction of House 007 could have been decades long, or a matter of months: given the continuity of use of Outhouse 006 across the transition, the latter estimate is probably closer to the mark (Figure 10.18).

The new build utilized the short east wall of House 312 as part of its own long east wall: the phase 8 longhouse was re-oriented north–south. It differed from previous houses on this spot by having two, opposing doorways, one to the west and the other to the east. The eastern doorway led to a narrow passage that exited through the earlier dumps of midden material. This east doorway was later blocked up, leaving the west door as the only exit, albeit into the teeth of the westerly winds. From this doorway, a slightly sunken pathway led towards the outhouse.

The longhouse was enclosed by an eavesdrip gully, the first to be employed on this site; its purpose is a little hard to understand because the sand subsoil naturally drains so easily but perhaps it was hoped that digging out such a soakaway would reduce damp within the house.

Inside the house, a ‘clean’ corridor of swept space, leading from the west doorway southwards between the west wall and the west side of the hearth is very apparent from the distribution of debris. Much of the material that did remain within the house was found in its north end, beyond the line of the opposed doorways, where these items had presumably been swept.

The accumulation of micro-debris is uneven within the north end of the house and suggests possible impediments to accumulation in the two corners, possibly the result of the positioning of wooden furniture in these areas. The density of unburnt *Spirorbis* just inside and north of the west doorway may indicate where dried seaweed was stored.

There was very little pottery or animal bone in House 007; only the flint chips around the long hearth lay in quantities similar to those in previous buildings at Cille Pheadair. The densities of pottery, burnt mammal bone and fuel ash slag, as well as a flint strike-a-light, at the south end of the hearth indicate that this end was used for cooking. As in the earlier longhouses at Cille Pheadair, that end of the house furthest from the doorway (in this case the south end) was the focus for family life. Among the more personal items from the house and passageway are a smoothly polished black pebble – perhaps a kind of ‘worry bead’ – and a mount or strap-end with a tiny copper-alloy cast of a crouching lion. Unfortunately the floor deposits in the southern half were largely destroyed by later use, so we do not have a full picture of activities on the house floor.

When House 007 went out of use as a longhouse, it was partitioned by internal walls into a pair of cellular structures or huts (phase 9), discussed in Chapter 11.

11 Reuse and abandonment of the ruins of House 007 (phase 9), ending *cal AD 1160–1245*

M. Parker Pearson and M. Brennand
with contributions by H. Smith, H. Manley, P. Marshall, J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

11.1 Final use of the site

M. Parker Pearson and M. Brennand

When it was presumably in semi-roofed state, House 007 was modified after its initial abandonment to create a pair of small rooms, which we refer to as huts (Figure 11.1). These were built – and subsequently rebuilt – with walls of turf and stone and had thin floors of dark organic sand.

One of the characteristics of stone buildings of all periods on the machair from the Middle Iron Age onwards is their frequent re-use as 'shells' for new structures subsequently built inside them. The unravelling, during excavation, of the construction and occupation sequence of re-used structures is a complex and painstaking task, especially since the erection of new buildings (such as the huts inside the walls of House 007) often damaged the floors of the larger building within which they were constructed.

The size and shape of these huts within House 007 are similar to the dimensions of small field bothies still in use in the twentieth century. We have excavated comparable twentieth-century structures inside the broch of Dun Vulan (Parker Pearson and Sharples 1999: 196–7) and on Mound 2 at Bornais (Parker Pearson and Webster 1994). The phase 9 huts are also, of course, similar to the earlier outhouses (006 and 353) and to the sheds (400 and 406) at Cille Pheadair. Other huts very similar to these at Cille Pheadair have been excavated within small rectangular medieval houses at Eilean Olabhat and Druim nan Dearcag in North Uist (Armit 1996: 208–11, fig. 11.1).

At the north end of the site, ploughmarks running ENE–WSW might have been created at this time or even later. Another group of ploughmarks, running east–west, might also have been made around this time but these lay slightly further south on this north end of the mound, inside the line of the sandbank wall (see discussion of layers above the north revetment wall in Chapter 6).

11.2 Hut 084/026

M. Parker Pearson and M. Brennand

In the northeast corner of House 007, a small rectangular space was marked out with an interior east–west wall (084) to form a hut within the ruins (Figure 11.2). It was subsequently redefined by a second interior wall (026) on the same alignment (Figure 11.3).

First stage – Hut 084

The first stage of this structure in the northeast corner of House 007 was created by the building of a single-coursed stone wall (084) running 1.50m east–west from the east wall of House 007 (Figure 11.2). This wall and the walls of House 700 formed a three-walled rectangular space, measuring 2.15m north–south by 1.50m east–west, with a doorway in the southwest corner. Wall 084 was covered by a thick grey-brown sand (081), on top of which were the remains of a turf wall, consisting of a series of collapsed turf and sand layers (080, 079, 082 and 073). There was no evidence of a floor layer within this area bounded to the south by wall 084.

Outside the hut a white windblown sand (062=079) filled parts of the interior of House 007, covering the phase 8 hearth and floor. By the second stage of hut construction (Hut 026, see below), the windblown sand (062=079) had been covered by 061, a grey sand in the northwest quadrant of the ruins of House 007. Layers 062 and 061 are probably equivalent to layers 089 and 088 in the southwest corner within the walls of House 007 (north of Hut 031, see below). The fragmentation patterns suggest that layer 061 was a floor (see below).

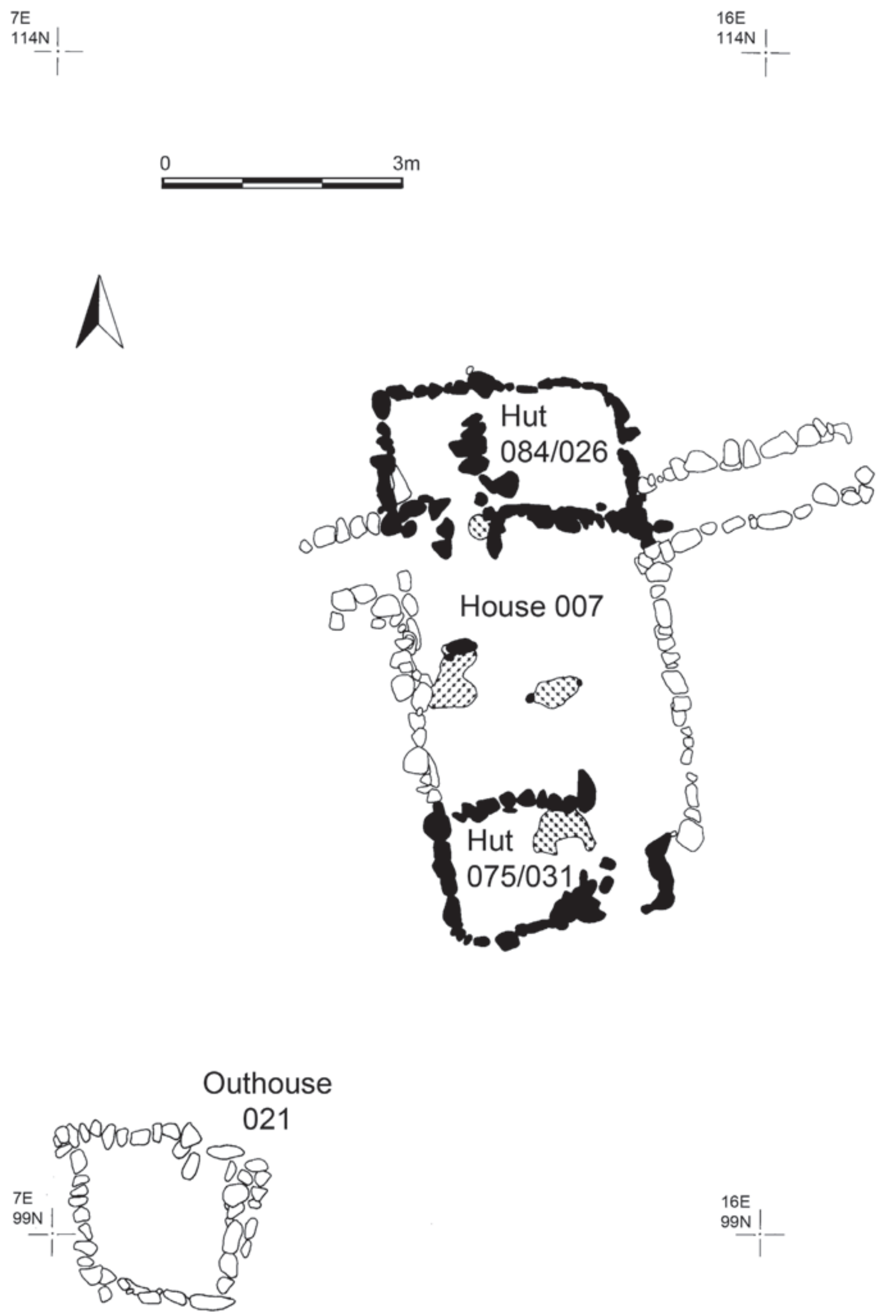


Figure 11.1. Simplified plan of phase 9 structures within abandoned House 007

Second stage – Hut 026

The second stage of the hut consisted of a well-built, three-course stone wall (026, immediately north of wall 084), running 1.70m east–west from the east wall of House 007 (Figures 10.8, 11.3–11.4). It is possible that this wall was once the eastern half of a longer wall since there was a hint of a continuation of 026 westwards to the north side of House 007's west doorway, with a possible entrance 0.70m wide through the middle of this south wall.

This second-stage hut had a lower floor of dark brown, soft, sticky sand (070) covering 061. Immediately above it was another floor, a brown sand (044), which extended across the entire north end of the ruined House 007 (see Figure 10.6). Finds from within 044 included a small silver bead (SF numbers are in Table 11.1) and, from its west side, a slightly worn silver short cross cut halfpenny dating to *c*. AD 1206, in the reign of King John. This fortunate find within a context close to the end of the occupation sequence provides a date shortly before abandonment of the site: the earliest date for its deposition is *c.* AD 1206 (see Chapter 13.17) but it could have been deposited many decades later.

A thin and ephemeral layer of peat ash (071) lay against the north half of the west wall 043, probably the remains a small and informal hearth. A second small hearth (045) lay within the south-facing entranceway (Figure 11.3). There was a thin spread of windblown sand between the earlier floor (044) and this hearth.

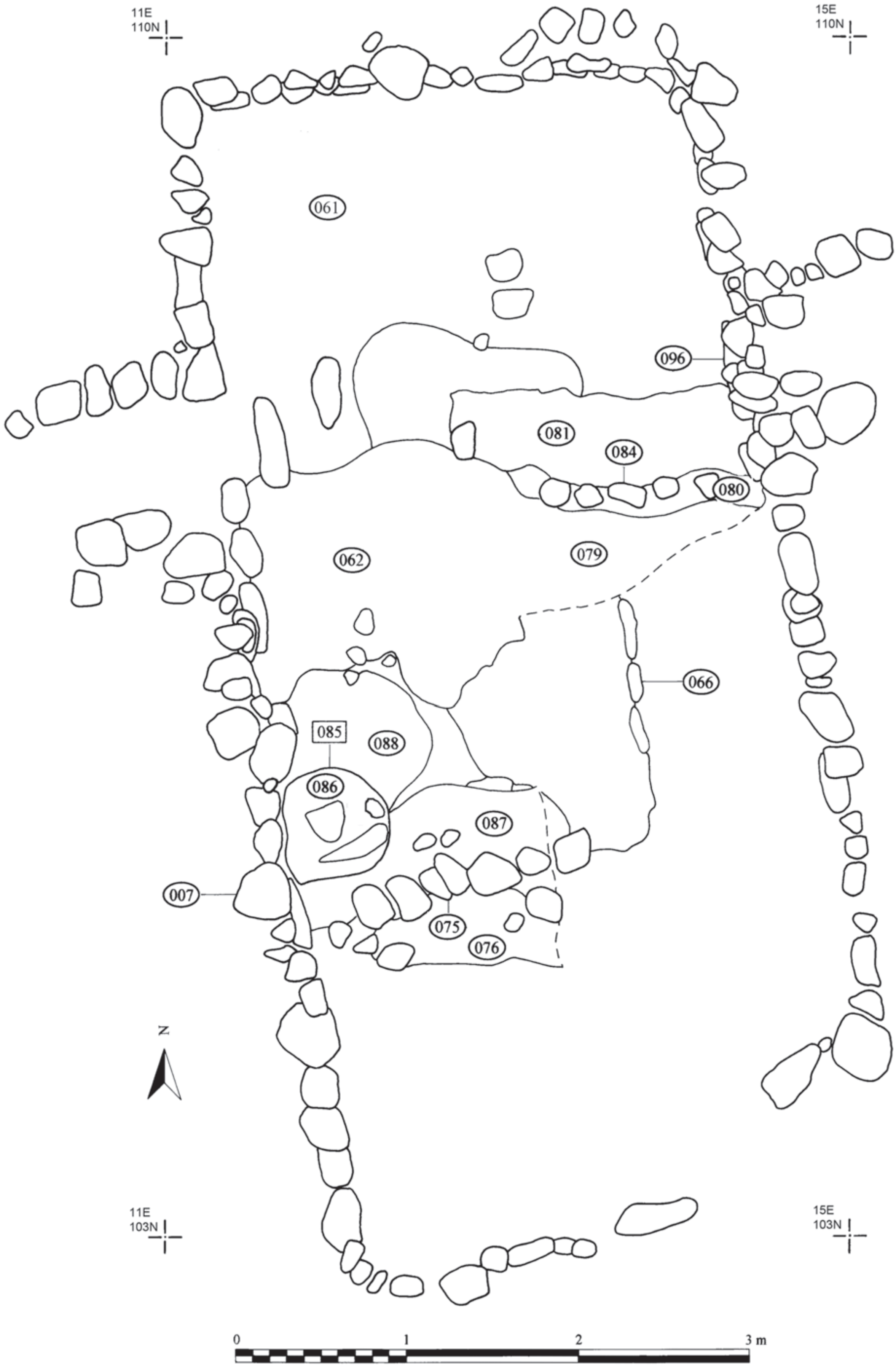


Figure 11.2. Huts 084 and 075 in the earlier occupation within abandoned House 007

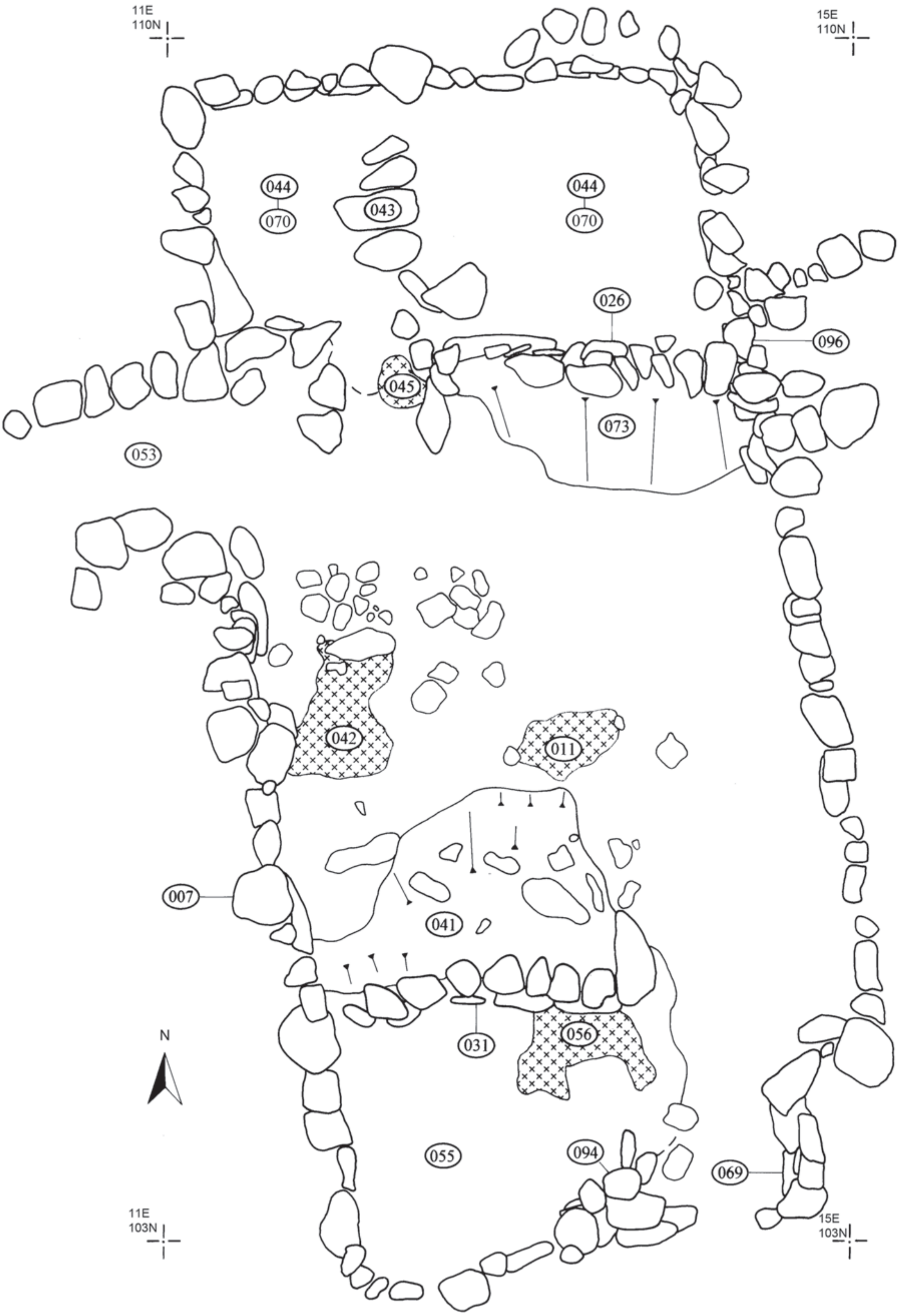


Figure 11.3. Huts 026 and 031 in the later occupation within abandoned House 007

Figure 11.4. Hut 026, viewed from the east

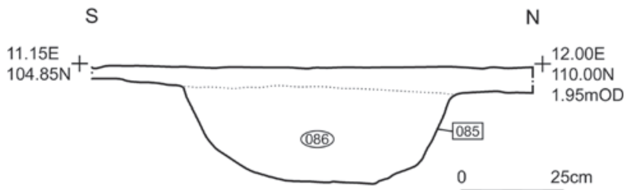


Figure 11.5. Section through pit 085 adjacent to Hut 075

Another floor layer was 053, a sloping sequence of thin multi-coloured lenses in the west doorway of House 007, which accumulated at some point during phase 9, probably towards its end, and provided access (presumably still roofed) to both the southwest and northeast huts within the ruins.

In the sequence above floors 070 and 044, a flimsy north–south wall (043), 0.70m long and consisting of a

Figure 11.6. Hut 031 within the quadrant-excavated House 007, viewed from the east

Figure 11.7. Filling-in of the abandoned huts within House 007

Figure 11.8. Windblown sand and rubble being excavated in quadrants from House 007, viewed from the north

Figure 11.9. Windblown sand and rubble filling House 007, before excavation, viewed from the north

single course of four stones, was built on top of floor 044 (Figures 11.3–11.4). This created a rectangular room measuring just 1.55m north–south and 1.65m east–west, with a small entrance 0.50m wide in the south end of its west wall (043), giving access directly to the west door of House 007.

Abandonment layers

The hut was subsequently filled by a series of localized layers: a layer of coarse white sand (025), under a brown sand (032), under a dark brown sand (024; see Figure 11.7) which had possibly slumped from the extensive phase 7 midden layer (009) outside House 007. These layers were

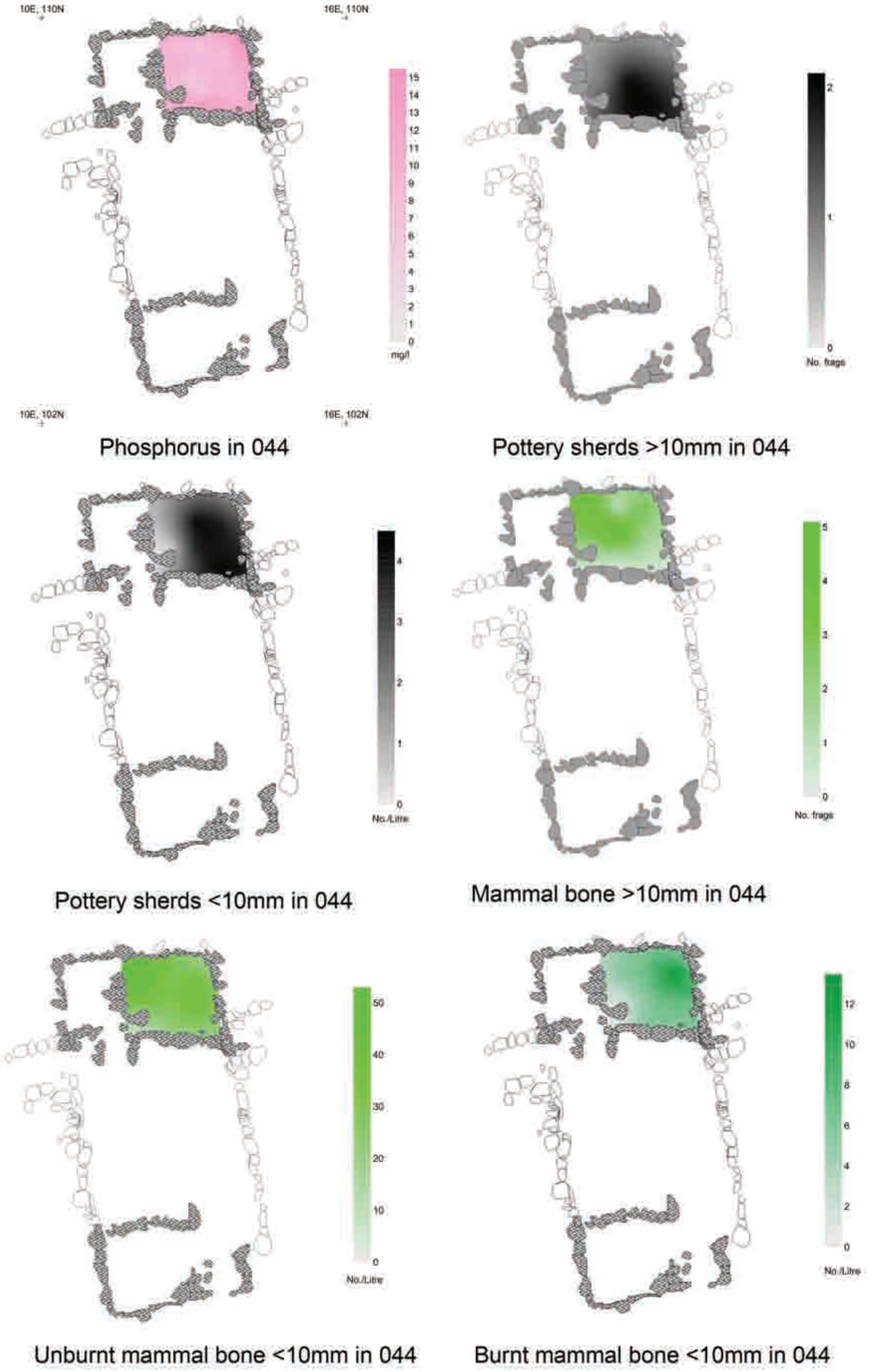


Figure 11.10. The distribution of total phosphorus levels, pottery, mammal bone, bird bone, fish bone, marine molluscs and crab in floor 044 of Hut 084 (continued opposite)

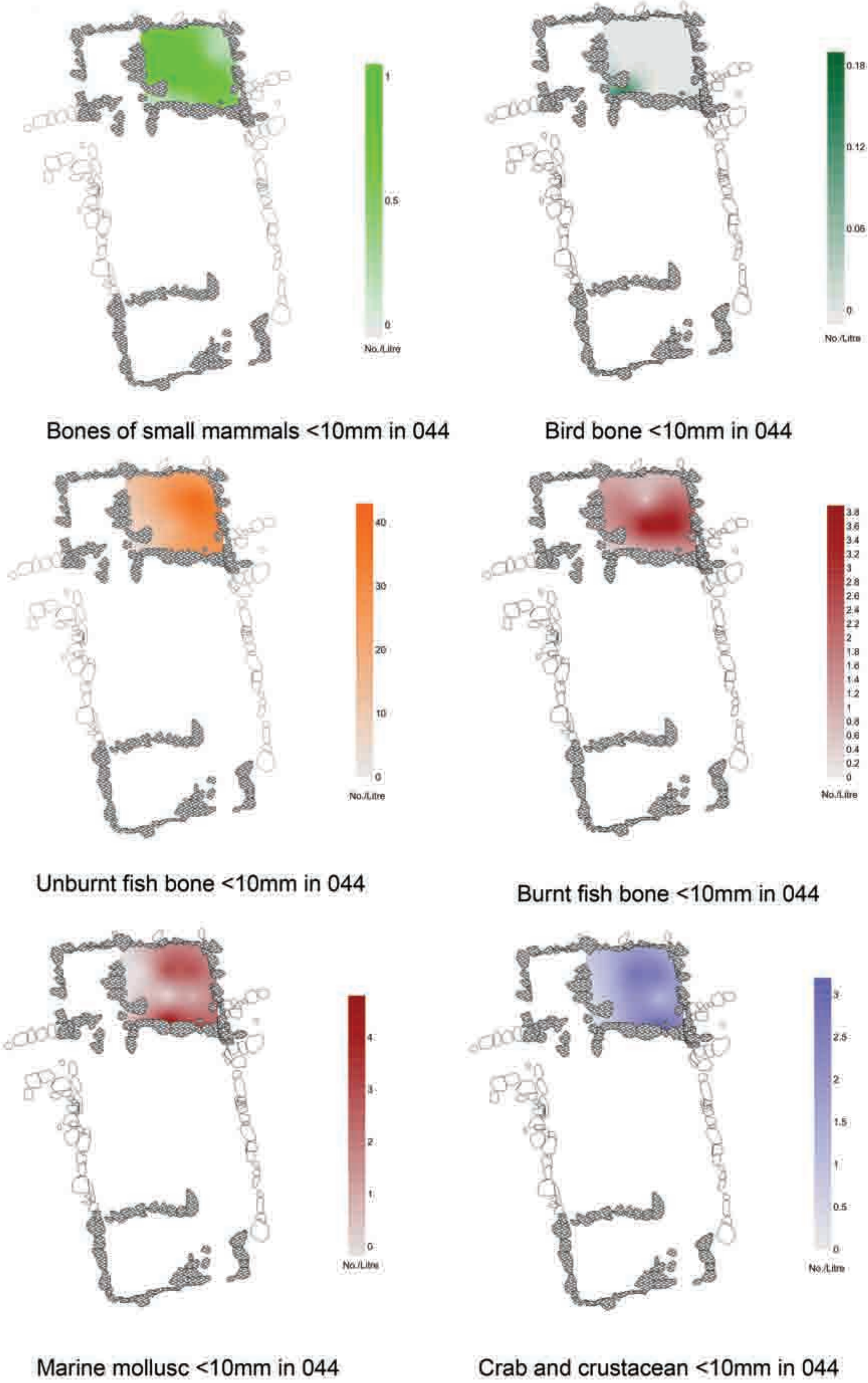


Figure 11.10. (continued from the previous page)

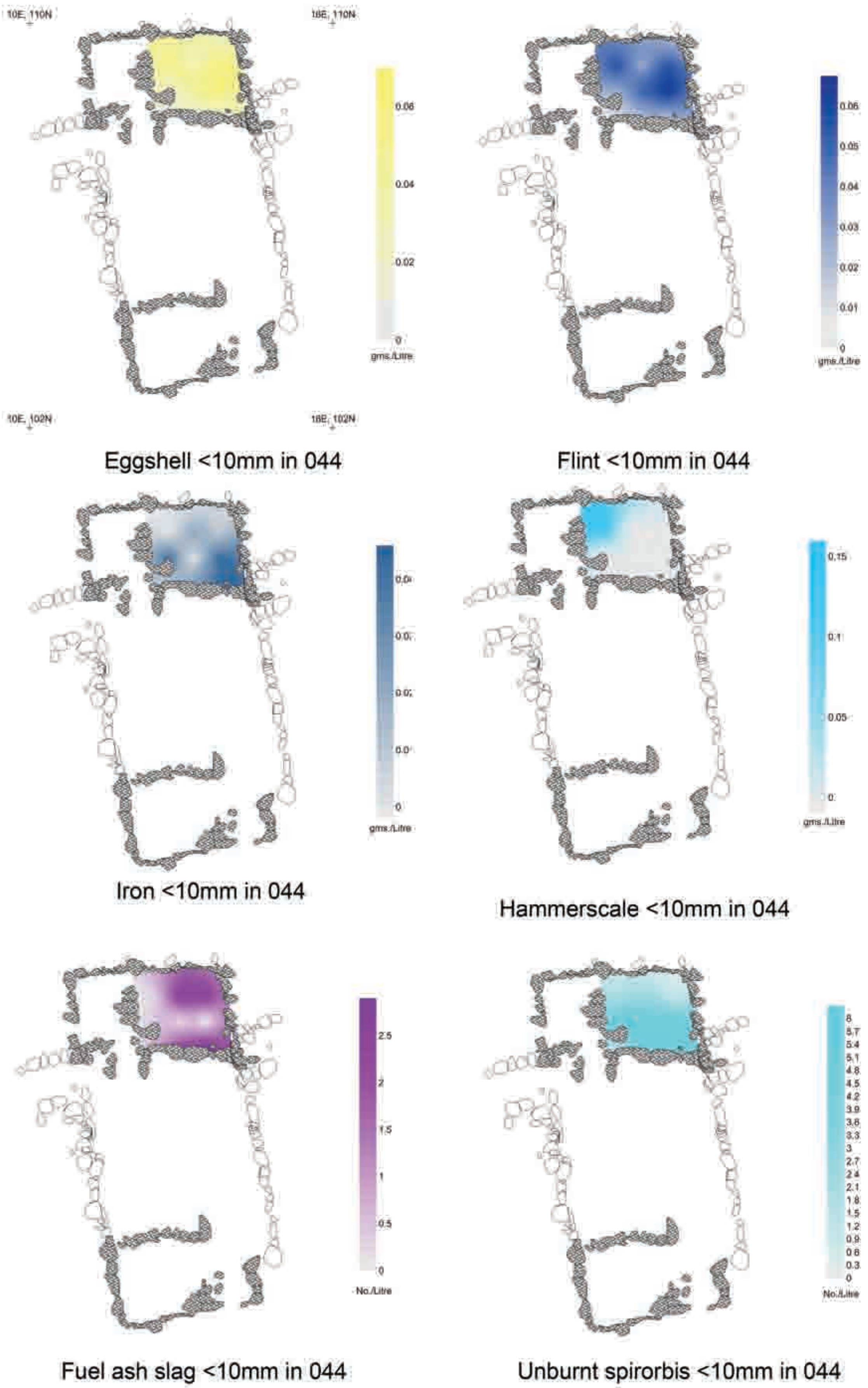


Figure 11.11. The distribution of eggshell, flint, iron, hammerscale, fuel ash slag, Spirorbis and coprolites in floor 044 and of pottery and mammal bone in floor 070 of Hut 084 (continued opposite)

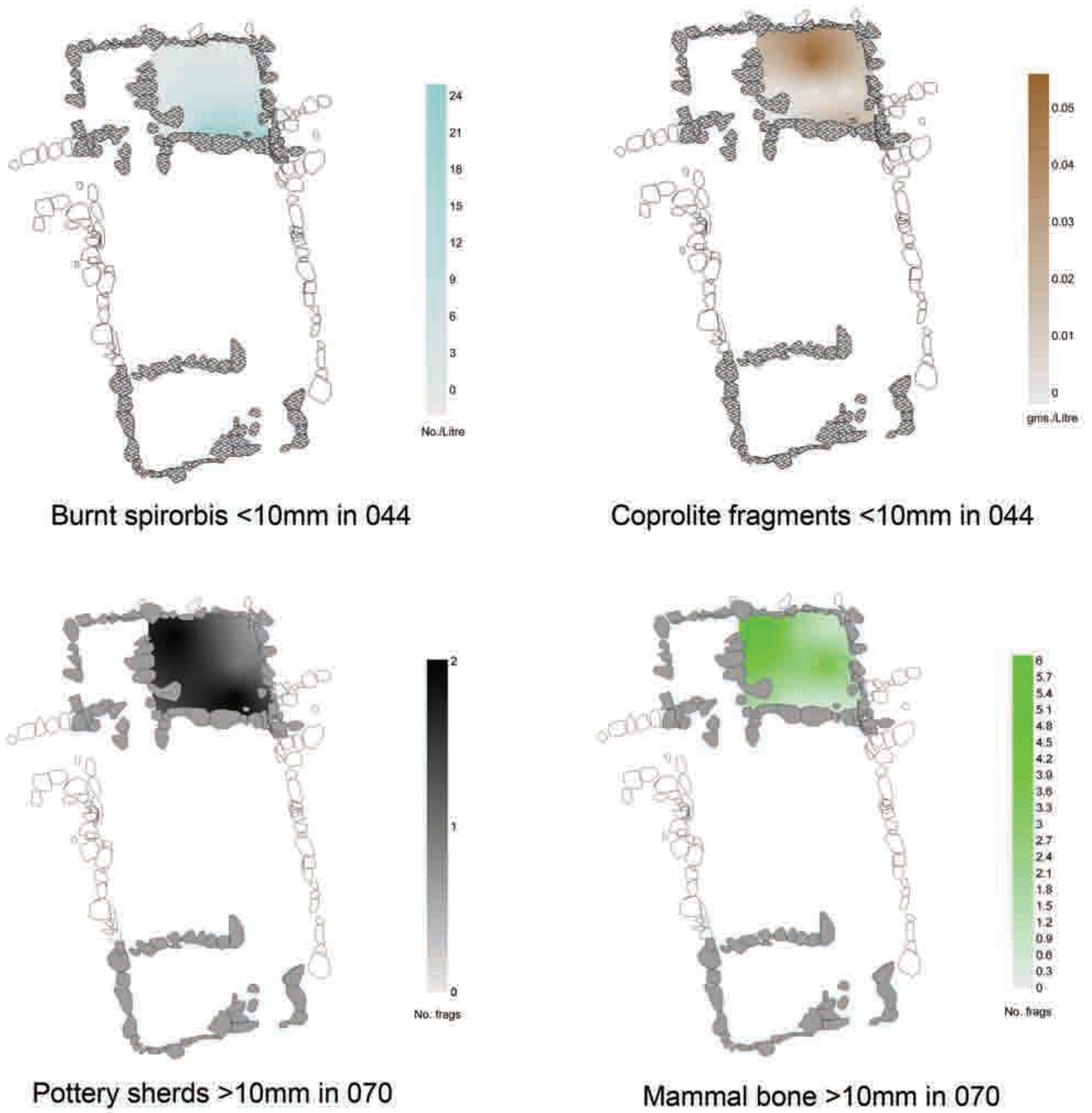


Figure 11.11. (continued from the previous page)

covered by the blown sand and rubble of layer 002 which filled the whole of House 007.

11.3 Hut 075/031

M. Parker Pearson and M. Brennand

The southwestern hut (Hut 075/031) was a two-stage structure, like the hut in the northeast corner of the house. It differed from Hut 084/026 in having a sequence of hearths within its walls.

First stage – Hut 075

A single-course stone wall (075), 2.10m long, was constructed to run eastwards from the west wall of 007 (Figure 11.2). This formed the third side of a rectangular area measuring 2.10m east–west and 2.60m north–south in the southwest corner of the ruined house. The stones of wall 075 were augmented by a red-brown organic layer (087) mounded up amongst and intermingled with the stones. A small heap of six cobbles (090) was sunk into the floor (092; phase 8) at the south end of House 007, dumped prior to construction of the hut.

There were no floor layers certainly associated with Hut 075. A thin layer of windblown sand (076) lay on the south side of wall 075 (Figure 11.2). A small patch

Table 11.1. Phase 9 non-ceramic artefacts by context and context type

Context type	Context no.	SF number	Artefact	Figure no.
PHASE 9				
wall	026		worked whale bone	
floor?	061	see Chap 15	iron nail	
floor	070	2808	fragment of a single-sided composite comb	13.5
		1301	club-headed bone pin	13.13
		2811	worked antler tine	14.1
		see Chap 15	unident iron fragment	
floor	044	2489	silver (?) bead	13.14
		1031	silver cut halfpenny of King John	
		1291	bone wedge	14.2
		see Chap 15	iron nail	
floor	053	see Chap 15	iron nail	
abandonment	024	see Chap 15	unident iron fragment	
abandonment	013		worked whale bone	
cobbles	090	1111	grinding stone	
pit fill	086	see Chap 15	iron strip	
fill	029	2488	bone bead	
turf wall	087	1304	fragment of a single-sided composite comb	13.5
sand/turf wall	041	see Chap 15	unident iron fragment	
floor	030	1040	iron ferrule	13.16
fill	028	see Chap 15	iron nail	

of dark grey sand (067) in the southeast corner of Hut 075 might have been the remnants of a floor. Above it, a floor of light brown sand (055) may also belong to this initial construction, but is more likely part of the second construction stage (see below).

Outside the hut, to its north, a layer of white windblown sand (089; the same as 062 and 079 outside the northeast hut) was covered by a layer of brown sand (088; the same as 061 to the north). As mentioned above, these formed on the abandoned hearth and floor of House 007, indicating that windblown sand could penetrate and build up in the house interior.

Both sand layers (089 and 088) were cut by a semi-circular pit (085), 0.68m in diameter and 0.26m deep, dug against House 007's west wall (Figures 11.2, 11.5). This pit's purpose is unknown but it might have held a post to support the house's ailing roof. In the pit's fine white sand fill (086) were stones that might have provided packing but there was no trace of a postpipe.

The semi-circular pit was covered by fill layers of brown-grey sand (029) and, above it, a dark brown sand (027; Figure 10.6). Sandwiched between them were the remains of a casual hearth (042) against the west wall of House 007 (Figure 11.3). On top of layer 027, another hearth (011) was in use to the east of 042. In layer 029 there was a small bone bead.

These deposits were covered by windblown sand and rubble (002), which filled to the top of House 007. A charred *Hordeum* sp. grain from hearth 042 gave a radiocarbon date of cal AD 1030–1250 at 95% probability (SUERC-4893; 855±40 BP) and a charred *Avena* sp. grain from hearth 011 a date of cal AD 1160–1290 at 95% probability (SUERC-4892; 805±40 BP).

The second stage – Hut 031

Subsequently, a second east–west stone wall (031), 1.60m long and standing two courses (0.30m) at the time of excavation, was inserted into a cut (078) and overlain by a bank of purple sand, probably decayed turf (041; Figure 10.8). This formed the north wall of a smaller hut, measuring1.60m east–west and 1.55m north–south, with a crude entrance 0.80m wide at the north end of the hut's east side (Figures 11.3, 11.6). From there, a gap through the rubble led northwards over the abandoned hearth of House 007 towards the old house's west door (Figure 11.7).

To the southeast, a stack of four stones (094) butted against the middle of House 007's south wall and might

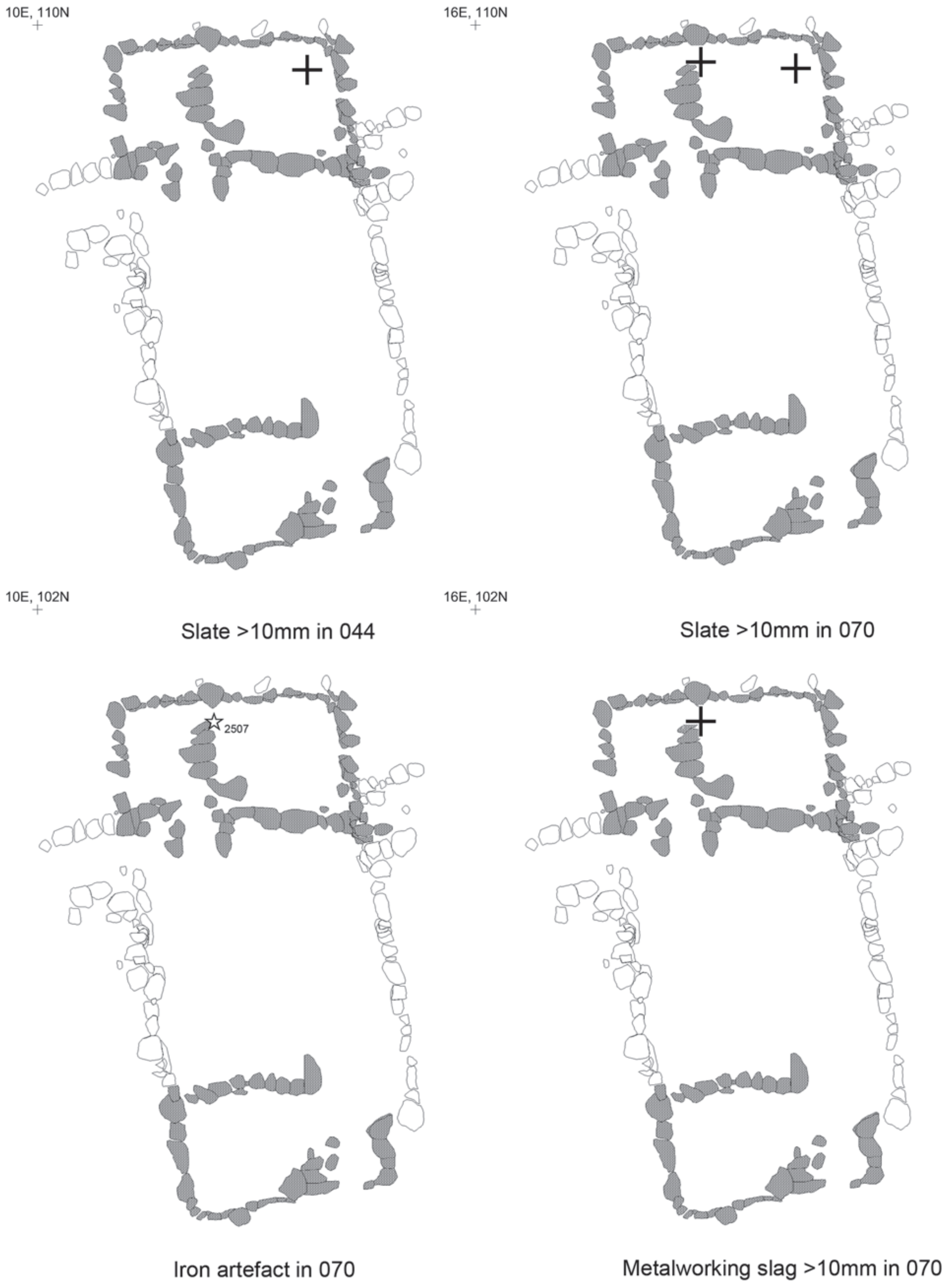


Figure 11.12. The distribution of slate in floor 044, and of slate, an iron artefact, and ironworking slag in floor 070 of Hut 084

have formed the southeast corner of the hut (Figure 11.3). A curving length of wall (069) in the southeast corner of House 007 is also associated with this hut and might have formed the east side of a step-up entrance through the house's robbed-out south wall (though there was no visible walkway).

There was a sequence of floors and small casual hearths inside Hut 031. Above floor 055 was a small hearth (057) within the doorway area (Figure 10.6). This was covered by a second hearth (056) slightly to its north, up against wall 031, where the wall stones showed marks of burning. Above this was a mottled, brown sand floor (030), covered by a dark brown fill (028). On top of layer 028 was a third hearth (012). These deposits were covered by the windblown sand and rubble layer (002) that filled the top of House 007 (Figures 10.6, 11.7–11.9).

Abandonment

Thereafter, there was no indication of any further human activity at the settlement. The turves which are assumed to have formed the outer walls of House 007 might well have gone by this point. The surface of the site was scoured by winds for an unknown period of time before it was eventually enveloped beneath the sand of the eastward-retreating coastal dune under which the site was identified during the winter of 1993–94.

11.4 The spatial patterning of debris within the hut floors

M. Parker Pearson, H. Smith, H. Manley and P. Marshall

Only floor 044 (east of wall 043) and floor 070 were excavated by grid square.

Floor 044 in Hut 084/026

Phosphorus

Phosphorus was highest around the edges of Hut 026 (Figure 11.10). There was no hearth in this hut's interior.

Ceramics

Of 22 sherds from this floor layer, only one was platter ware. Both large and small sherds were concentrated in the centre and southeast of Hut 026 (Figure 11.10).

Animal bone fragments

For the various distributions of animal bone (Figure 11.10) the only noticeable variations are that burnt mammal bone was concentrated in the northeast and burnt fish bone in the southeast, unburnt fish bone being distributed generally in the east and bird bone in the southwest.

Crustaceans, marine molluscs and eggshell

Crustacean remains were concentrated in the northeast and south (Figure 11.10). Marine molluscs were collected and counted in this instance; they show a very general distribution (Figure 11.10). Eggshell was concentrated in the east and northwest (Figure 11.11).

Stone

A single piece of green slate came from the northeast corner (Figure 11.12). Pieces of flint were found in the northwest and east (Figure 11.11).

Bone and metal artefacts

A small bead, probably of silver, was found in the southeast. Other finds from floor 044 were a nail and a bone wedge. Iron fragments were concentrated in the southeast and southwest (Figure 11.11).

Iron-smithing slag, fuel ash slag and hammerscale

Hammerscale was concentrated in the northwest and fuel ash slag was spread across the northeast and south (Figure 11.11).

Spirorbis

Both burnt and unburnt *Spirorbis* fragments were concentrated in the south (Figure 11.11).

Coprolites

Coprolite fragments were concentrated in the north (Figure 11.11).

Floor 070 in Hut 084/026

Ceramics

Pottery was broadly distributed except in the northeast corner (Figure 11.11).

Animal bone fragments

Animal bone fragments were also broadly distributed, with a concentration in the northwest (Figure 11.11).

Stone

Two pieces of green slate were found, one at each end of the north wall (Figure 11.12)

Bone, antler and metal artefacts

An unidentifiable fragment of iron was found against the west end of the north wall (Figure 11.12). The other artefacts from this floor are a comb fragment, a club-headed bone pin fragment and a perforated antler tine (Table 11.1).

Iron-smithing slag

A piece of slag was located in the northwest corner (Figure 11.12).

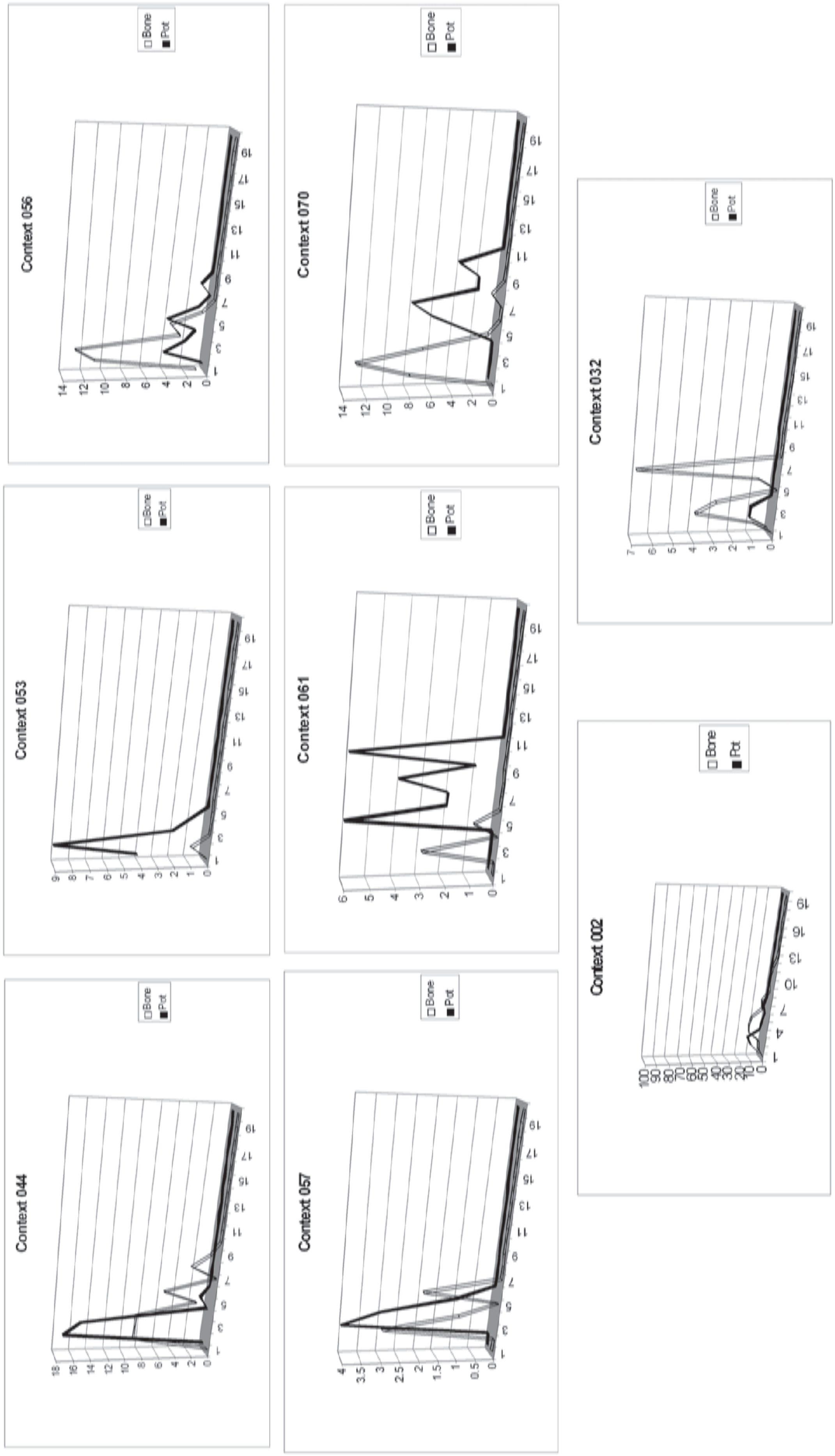


Figure 11.13. The fragmentation of sherds and bones in phase 9 floors and hearths (044, 053, 056, 057, 061, 070) and windblown fill layers (002, 032)

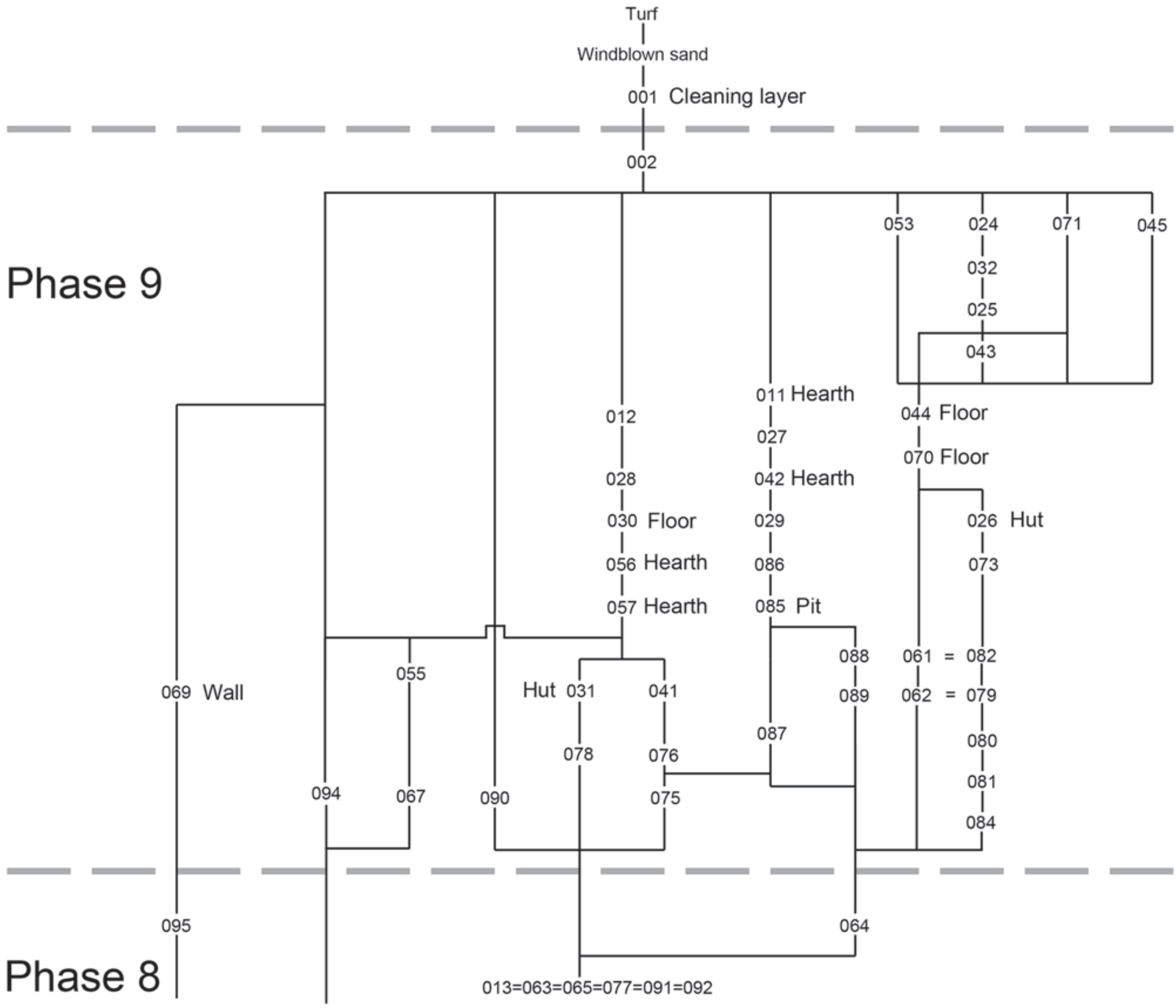


Figure 11.14. Stratigraphic matrix of contexts in phase 9

Floors 061 and 053 in the northwest corner of House 007

Floor 053 was the entrance ramp though the dilapidated entrance in the wall of House 007 that had served as that house's western doorway. A single iron nail and 15 sherds (five of which were platter) came from here. Inside House 007, layer 061 appears to have been a floor layer on the basis of its fragmentation pattern (see below). It contained a nail and 17 sherds (of which eight are platter ware).

Floor 030 in Hut 075/031

The finds from 030 consisted of an iron ferrule for a baton and nine sherds of pottery, of which one was a piece of platter. Two of the hearths (056 and 057) within the hut produced 11 and four sherds respectively. There were no finds from floors 055 and 067. Of the two hearths north of the hut, only 042 produced any artefacts, just two sherds.

Overview

The absence of hearths associated with floor 044 and floor 070 suggests that the northeastern hut (Hut 084/026) was not a dwelling place. Yet there was twice as much pottery from its floors as from the southwestern hut (Hut 075/031) and nine artefacts as opposed to just one. Conversely the presence of a sequence of small hearths within and outside Hut 075/031 does not make it a dwelling either, since these short-lived deposits are not associated with any substantial domestic debris. The huts are probably best understood as shelters, like the bothies of recent times.

11.5 Artefacts and other remains from the huts and associated deposits

M. Parker Pearson with J. Bond, C. Paterson, J. Mulville, C. Ingrem and P. Austin

All deposits of phase 9 were located within the ruins of House 007. Despite the deposits' restricted extent, they

were surprisingly complex. They consisted of floors, hearths and stone walls as well as turf walls, fill layers, windblown sand layers, a pit fill and the final abandonment layers that sealed this final phase of habitation at Cille Pheadair. The small quantities of bones and sherds from the turf and soil of the huts' walls probably derive from earlier phases.

Fragmentation

There are no large assemblages (*n*=>100) from this phase.

Of the floor layers, only 044 and 070 have medium-sized assemblages; both floors produced medium-sized bone fragments, and 044 produced small sherds (Figure 11.13). Floor 070 had the same number of sherds to bones, whereas there was twice as much pottery in floor 044 as there were bone fragments. The assemblage from layer 053, in the doorway of House 007, consists almost entirely of small sherds. Layer 061 has an unusual profile with large sherds and a few small bone fragments, consistent with being a floor layer.

In the southeast hut, floor 030 produced a small assemblage of small bones and medium-sized sherds whilst the medium-sized and small assemblages from hearths 056 and 057 consist of medium-sized bone fragments and sherds, with middling to high proportions of pottery. This reveals an interesting distinction between the two huts. The pottery on the floor of the northeast building exhibits a greater degree of trampling. This might therefore have been a more intensively used structure.

Most of the fill layers produced assemblages too small for analysis. The small assemblage from layer 027 consists entirely of medium-sized bone fragments.

The medium-sized and small assemblages from abandonment layers 002 and 032 both contain large bone fragments, with equal quantities of medium-sized pottery in 002 and just a couple of sherds in 032. The origin of this material in the final deposition at Cille Pheadair is unknown but it presumably came from another house in the vicinity, possibly now eroded by the sea.

Bone, antler and metal artefacts and worked stone

Most non-ceramic artefacts from this phase were found in the huts' floor layers, and are mentioned above. This phase produced very few iron artefacts, and no clench nails or roves. From contexts other than the floor layers came:

- a comb fragment from the turf wall (087) of hut 075,
- an unidentifiable piece of iron from the turf wall (041) of hut 031,
- single nails from fill 028,
- a fragment of an iron strip from pit fill 086,
- a piece of iron (024) and three struck flints (002), both of which are abandonment layers.

A grinding stone found within the cobbles (090) and a shaped stone from possible wall 094 were probably salvaged from earlier contexts for re-use in the huts' construction.

Ceramics

The very small size of the assemblage – just 162 sherds – limits any conclusions about pottery use in this final phase. However, there are one or two striking differences between phase 9 and phase 8 (and earlier periods) that suggest certain changes in ceramic form. Almost all pot forms in phase 9 are curved rather than convex, a complete reversal of phases 7 and 8 in which convex vessels dominated. Rounded basal angles are also common in this phase whereas they are virtually absent in all phases since phase 4. This final phase may represent the transition to a late medieval ceramic repertoire of concave pots with rounded bases.

Platter ware is still present but it drops to just 16% of the total ceramic assemblage for phase 9. Platter ware was clearly still in use, since pieces lay on the huts' floors and are most unlikely to have been redeposited from earlier contexts.

The vast majority of sherds come from floors and are thus likely to relate to activities in phase 9. In the northern part of House 007, floor layers produced 66 sherds of which 15 were platter ware. From the southern half came 26 sherds, of which just one was a piece of platter. The only other context with a substantial quantity of sherds was the abandonment layer 002.

Mammal and fish bones

J. Mulville and C. Ingrem

Phase 9 contexts produced a small assemblage of only 361 identifiable fragments of mammal bone.. Sheep/goat are more predominant in this phase, with both cattle and pig decreasing in frequency. Other domestic species present are dog, cat and horse, each represented by only a very few fragments. Red deer, roe deer and both species of seal are present as wild species.

Phase 9 contexts produced a similar quantity (*n*=26) of >10mm identifiable fish bone fragments as for the previous phase Apart from a single fragment belonging to eel, all the remains again belong to gadoid fish. Again, the <10mm assemblage is significantly larger, comprising a total of 448 identified specimens (total *n*=474), but there are few changes in species representation, with a single appearance of mullet.

Wood charcoal

P. Austin

Amongst the wood charcoal from phase 9 contexts, a total of 12 taxa were identified. Heather and Willow/Poplar are the most prolific, followed by Alder, Larch and Larch/Spruce, then Birch, Rose and Honeysuckle, and finally Hazel, Oak, Ash and Holly. This would seem to be a particularly taxon-rich phase, and hearth 056 in Hut 031 best represents the

full range of taxa exploited. The preponderance of Heather and comparatively high occurrence of wetland taxa (Alder, Willow/Poplar and Birch) suggest that peat was the main fuel used, supplemented by opportunistically available woods, notably Larch/Spruce.

11.6 The final use and abandonment of the site

M. Parker Pearson

The coin dating to the reign of King John (*c.* AD 1206) and the modelled radiocarbon dates coincide to indicate a date of abandonment in *cal AD 1160–1245* (*95% probability)* and probably *cal AD 1175–1220* (*68% probability*). The ruins of House 007 were occupied in an extempore or intermittent manner, similar to the historical and early modern use of small stone structures as bothies. The abandoned longhouse's interior was divided up into three areas by a pair of small walls (084 and 075) defining rectangular cells at opposite corners of the building, leaving an intermediate space between them. These huts were modified by re-building of the two interior walls (026 and 031). A roof may still have covered the entire structure: a single pit suggests a post could have propped up its west side. Access was gained through the former west door of the derelict longhouse. The two stages of the huts' use were probably short-lived (Figure 11.14).

The later stage of the huts' life included the use of a series of small, informal peat-fired hearths. The unusually varied list of tree species found as charcoal in these hearths may reflect the stripping-out of the ruined longhouse's wooden furniture, fittings and fixtures for use as firewood. Amongst the devastation, rubbish was probably still taken out of the house; the small sizes of sherds lying on the huts' floors indicate that larger fragments of broken pottery were presumably removed and dumped beyond the edges of the excavated area.

Whilst some of the artefacts and animal bones found within the turf walls belonging to this phase were possibly re-deposited from earlier phases during wall construction, those found on the huts' floors can be assigned to this final phase with confidence. They indicate that the building was used for certain domestic activities. As with the preceding sequence of longhouses, the huts' inhabitants cooked and ate mutton, beef, some pork and venison, and a small amount of fish. The low levels of domestic waste, however, make it likely that the huts in the ruined house were never occupied in any long-term, permanent fashion by a household. Presumably, their occupants were temporary visitors from more permanent dwellings elsewhere. Among the more unusual artefacts that they left behind were two of the site's three beads, a ferrule for a stick or baton, and a slightly worn and cut-in-half silver penny.

Within the windblown sand and rubble (002) filling the abandoned huts, a large sherd with an everted rim (see Figure 12.24) signals the adoption around AD 1200 of a new ceramic style, characterized by everted rims and rounded basal angles. This marks the transition from Norse-period to medieval ceramics in the Western Isles.

12 The ceramics

J. Bond, E.J. Pieksma, D. Dungworth and M. Parker Pearson

12.1 The local pottery

J. Bond

The excavations at Cille Pheadair produced 9,395 sherds of coarse pottery, 29% of which is identifiable as platter ware, the distinctive flat 'baking sheets' first identified by Lane at the Udal (Lane 1983; Table 12.1). The majority of the pottery is typical of that from the Late Norse period (*c.* AD 1050–1266), being handmade and poorly fired, though a small number of sherds of green-glazed imported pottery were also recovered (see section 12.2 below).

The Norse-period pottery is similar to that from other sites of this period, such as the Udal, Barabhas 2[1] and the three mounds at Bornais (Lane 1983; 1990; 2005; 2007; 2014; Harding and Sharples in Sharples forthcoming). As well as the platter ware, sherds from convex bowls are well represented, as are sherds with grass-marking. Vessels with a flaring, flowerpot shape are also present, similar to the tongue-and-groove constructed 'buckets' from the Late Iron Age period (see Lane *passim*), though with angle-slab construction and sometimes grass-marking. Sherds from thinner walled and finer finished vessels are uncommon at Cille Pheadair.

The Cille Pheadair pottery is very variable in terms of finish, form and size, due mostly to its handmade construction, though still falling within the general style of the Norse period. The poor quality of its shape/finish and firing are, I think, also influenced by changes in the use and significance of ceramic vessels, which appear to decline from some time in the Middle/Late Iron Age. The introduction of new forms in the Norse period, including the platter form vessels, may reflect changes in either methods of food production, or types of produce consumed.

Recording

The sherds were divided into five categories:

- RIM (6%)
- BASE (7%)
- BODY (14%)
- PLATTER (29%)

Table 12.1. Pottery sherd weights and numbers by phase

Phase	Number of sherds	Rim	Base	Body	Platter	Misc.	Average weight (g)
1	223	24	26	45	11	117	10.9
2	466	48	74	74	52	218	14.5
3	154	17	29	30	7	71	9.7
4	1961	152	114	302	322	1071	7.5
5	2305	142	202	360	604	997	7.2
6	1043	76	70	143	344	410	10.5
7	2262	101	136	266	1003	756	5.4
8	819	24	64	113	343	275	6.0
9	162	9	22	17	26	88	6.2
Total	9395	593	737	1350	2712	4003	

- MISCELLANEOUS (44%). Those sherds either too small (<25mm length) or too badly worn or damaged to be identified are placed in the miscellaneous category.

The sherds were recorded in some detail with regard to:

- the form of vessel (convex bowls, curved vessels of uncertain form and upright/flaring vessels, as well as the platter form vessels);
- the size of vessel (including wall thickness and rim/basal diameter);
- finishing techniques used (grass-marking, finger-impressing, stabbing *etc*.);
- colour (interior and exterior);
- deposits and residues;
- rim and basal form (round, flat *etc*. for rims and flat, sagging *etc*. for the basal sherds).

Fabrics

The platter vessels were treated as having only a single fabric type, whilst the sherds from other vessel types were assigned to nine fabrics (A to I, plus a 'question mark' category for those sherds too worn/damaged to be identified to fabric). All of these fabrics are considered to be variations of the basic fabric type, as supported by the thin-section analysis of their petrology. These nine fabrics are probably the result of natural variation, resulting from the handmade nature of the ceramics, rather than from any deliberate choice.

The ten fabrics are characterized as:

A: A rough, gritty and hard fabric with quantities of Lewisian gneiss and other minerals. Surface finish is variable, with smooth, rough, wiped and grass-marked examples all being recorded. Ranges in sherd thickness from *c.* 7–8mm up to *c.* 18–20mm though most sherds of this type are between 8mm and 12mm thick. Found in all the possible colour variations, though most sherds are of grey or buff colouring.

B: As above, with a higher percentage of larger chunky grits, otherwise similar in all respects.

C: A smooth, hard and shiny fabric, though considerable quantities of Lewisian gneiss can be used as an inclusion. Smoothed or burnished surfaces are common, though examples with only one treated surface are also common. Ranges in sherd thickness from *c.* 3.5mm to *c.* 7mm, though most sherds of this type are 4mm–5mm thick, and usually of a black or dark grey colouring, though some sherds with buff-coloured patches were recorded.

D: A smoother, softer and less gritty fabric, though some of the variants assigned to this group have considerable quantities of quartz/quartzite as inclusions. Less commonly found with surface treatment, though examples do exist with grass-marked or wiped/striated surfaces. Ranges in sherd thickness from *c.* 5mm to 14mm, though most sherds of this type are 8mm–12mm thick, and are usually pale buff in colour.

E: A smooth, hard and less commonly occurring fabric, distinctive by its thin walls (*c*. 4mm–8mm) and laminated fabric. Possibly a misfired variant of A fabric. Predominantly of grey/buff/reddish colouring

F: A similar fabric to C fabric, though with the addition of shell fragments and large mica grits.

G: Abundant quartz/quartzite grit, otherwise as A/B fabrics.

H: As G fabric, though softer and more crumbly, usually red/orange in colour. Probably not a truly separate fabric, rather created by firing variations.

I: A soft, smooth and clayey fabric, with little or no grit, finely laminated. Example with grass-marking and iron-staining. Grey in colour

J: **Platter fabric**. A soft, irregular and gritty fabric, which is subdivided by the presence/absence and quantity of grass-marking (heavy, light, none, cracked). Can also have a variety of other surface treatment/finishes, most commonly fingered, smooth and undulating/channelled, though others such as fingernail impressions and stabbed or pierced holes also appear. Ranges in thickness from *c.* 4mm to *c.* 14mm and commonly 4mm–7mm or 8mm–11mm thick. Mostly of grey and buff/red colouring.

The majority of sherds are of the A fabric (60%; *n*=1608 out of 2,680 sherds [a subtotal not including platter or miscellaneous sherds]). The next most common fabric type is B (8%; *n*=205), then C (5%; *n*=127), E (4%; *n*=111), D (3%; *n*=83), H (3%; *n*=72) and G (2%; *n*=42). The least numerous are sherds of fabric types F (<1%); *n*=15) and I (<1%; *n*=6). The remaining 13% of sherds could not be categorized to a fabric type.

There is little stratigraphic patterning of fabrics except that B and H become less common after phase 6 whilst G declines after phase 5. Only fabrics D and I are not represented in phase 1. Petrological analysis confirms that all fabrics were made of similar gneiss-derived clays, likely to be of local origin.

Vessel forms

Rim, base and body sherds were categorized by form according to the following scheme, which acts as the key to the tables:

1. Convex
2. Curved/convex
3. Open/flaring
4. ?

Vessels with a curved or convex bowl shape appear to predominate, whilst sherds from open/flaring vessels are less common though present in all phases.

Sherd thickness

Rim, base and body sherds, as well as platter sherds, were categorized by thickness according to the following scheme, which acts as the key to the tables:

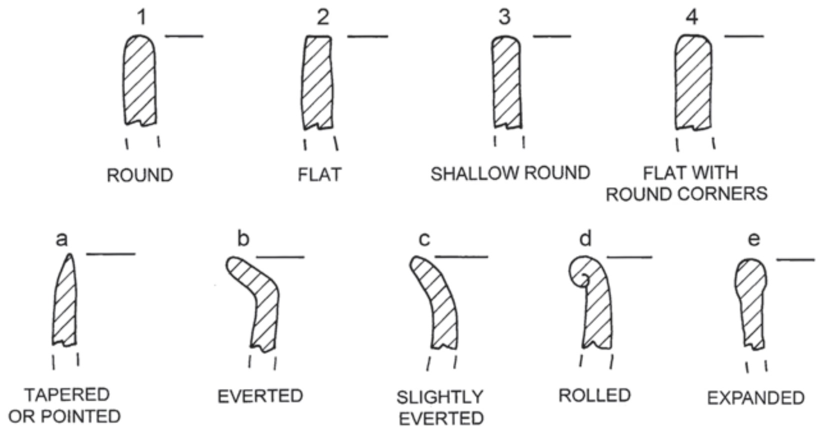


Figure 12.1. Classification of rim types

1. Thin (<6mm)
2. Medium (6mm–9mm)
3. Thick (9mm–14mm)
4. Very thick (>14mm)

The wall thickness of sherds ranges from *c.* 3mm to 20mm, though most sherds are 8mm–14mm thick. Most rim sherds fall towards the thinner end of this range, whilst the body sherds mostly lie at the upper limit of the range, as do the basal sherds. The thickness of sherds from some of the less common fabric types, such as C, D and E, tends towards the thinner end of the range for rim, base and body sherds. The majority of platter sherds fall into a thickness range of 6mm–14mm, with only 95 platter sherds (out of a total of 2,713 platter sherds) falling outside this range.

Rim forms

The categorizing of rims by rim edge finish was undertaken in the hope of finding significant variation as an indicator of temporal or functional differences. The main rim categories are for rim edge finishing, with additional categories for form including tapered/pointed, everted, slightly everted, rolled and expanded/lipped (Figure 12.1, which acts as the key to the tables).

The majority of non-platter rim sherds have a rounded profile, though other types, including flat finished rims, are common, with slightly everted types forming a small percentage of all phases. Rolled rims are only present in phases 4, 6 and 9 whilst expanded/lipped rims are present in all phases except phases 1, 8 and 9.

Platter rims were categorized according to a slightly different scheme:

1. Round
2. Flat
3. Bevelled inwards
4. Bevelled outwards

Bases

Base sherds were divided according to type of base:

1. Flat
2. Sagging
3. Omphalos
    a. Footed
    b. Rounded basal angle (RBA)

Base sherds were also categorized by angle:

1. Shallow
2. Medium
3. Steep
4. ?

The majority of vessels appear to have had sagging bases, though flat-bottomed vessels are present in all phases. Some of the bases are also footed, though only a small percentage, and these are present in all phases except for phase 9. The footed bases were counted as an additional feature for bases already classified as either flat, sagging or omphalos, and this applies equally to those bases including a rounded basal angle (RBA). Omphalos bases are very infrequent, with only one sherd each from phases 4 and 5.

Vessel sizes

Vessel rim and base diameters range from *c.* 100mm to over 350mm, with most falling between 180mm and 260mm. Few platter rim sherds provided clear indication of vessel diameter, partly because platter ware was sometimes sub-circular in shape, though the platters probably had a minimum diameter of *c.* 100mm–120mm, with the largest examples being over 300mm. Their commonest size was *c.* 300mm.

The height of vessels was seldom noted, mainly because of the infrequent recovery of rim to base profiles, though examples range from 65mm in height to over 180mm, with most being between 95mm and 120mm high.

The lengths of all sherds (except those classed as miscellaneous) were recorded, and this information is presented in the fragmentation graphs in Chapters 3–11 which show pot and bone sizes by context.

No attempt has been made to give total numbers of vessels, for any type, for a number of reasons, mainly

resulting from the handmade nature of the pottery. It may be possible to quantify vessels by sherd weight, though this method does not appear appropriate for the assemblage from Cille Pheadair, as no two vessels are identical, with variations in vessel height, diameter, wall thickness and form, as well as grittiness of fabric. The use of rim EVES (estimated vessel equivalents) was also not thought to be useful, given the variations in any single vessel in terms of rim form, colour, finishing and diameter. Similar caveats apply to any calculations from either base or body sherds.

Colour

Rim, base and body sherds were categorized by colour according to the following scheme, which acts as the key to the tables:

1. Grey
2. Buff/brown
3. Orange/red
4. Pink/purple

Platter sherds were categorized in a slightly different range of colours:

1. Grey
2. Buff/brown
3. Orange
4. Red

Finishing techniques

A variety of finishing techniques were utilized, with grass-marking being very common (especially on the platters), whilst light organic impressions are often found on sherds without grass-marking, notably on rim sherds, suggesting a lessening of organic material being added further up the sides of the vessels. Other common finishing techniques include smoothed or wiped surfaces, some of which appear to have been wiped using handfuls of grass (or something similar), whilst finger-marks were often noted (especially on platter sherds). A large number of platter sherds have finishing techniques exclusive to this form, including stabbed or pierced holes, and heavily fingered grooves or channels; seed impressions are also common.

Rim, base and body sherds were categorized by finish according to the following scheme, which acts as the key to the tables:

1. Smooth
2. Wiped
3. Rough
4. Organic impressions
5. Grass-marking
6. Fingered

The platter sherds were categorized according to both their interior (upper surface) and their exterior finish (lower surface), in terms of presence/absence of grass-marking and cracking.

Exterior platter finish:

1. Light grass-marking
2. Heavy grass-marking
3. No grass-marking
4. Cracked

Interior platter finish:

1. Fingered
2. Finger-impressed
3. Channelled
4. Pierced
5. Stabbed
6. Grass-marked
7. Seed impressions

Residues and sooting

The type of residues and deposits adhering to the sherds was recorded in a scheme from 1 to 4, consisting of blackening (1), sooting (2), carbonized residue (3) and off-white residue (4). Since off-white residues are rare on platter ware, the platter sherds were catalogued with 1–3 only. The location of such deposits, whether on the exterior or interior of the sherd, and also its quantity were also noted. Many of the sherds have a combination of more than one type of deposit or residue, and therefore the tabulated data for the deposits often show a total number of occurrences greater than the number of sherds present.

Chronological development

The ceramics can be analysed in terms of their ‘biographies’ or sequences from construction (form and finish) through firing to use and breakage. The presence of potting clay on the site from phase 1 to phase 7 indicates that much if not all of these earthenware vessels could have been made at Cille Pheadair and the ceramic petrology confirms origins within the local lithology.

Form

Vessel forms can be described in terms of fabric, wall thickness (including platters), vessel shape, diameter of rim and base (including platter diameters), base angle and base type. Form can be distinguished from finish (surface treatment and rim type) although this is something of a false distinction and is made for clarity of description.

Fabrics

Fabric A is the dominant fabric throughout the non-platter ceramics (and even then, the platters are of a fabric which is largely the same). Fabric B is present throughout but, like most of the other fabrics, only becomes common from phase 4 and is scarce after phase 6. Phase 6 is different from other phases because its pottery shows a marked reduction in the use of fabrics C–G. Fabrics F, G and I are absent by phase 8. The heyday of fabrics C, D and E is phase 7 whilst fabrics G and H are most popular in phase 4.

Table 12.2. Pot diameters by phase

Rims (mm)								
Phase	**50–100**	**100–140**	**140–180**	**180–220**	**220–260**	**260–300**	**300–350**	**>350**
1			1		6	1		
2		1	3	5	14	2		5
3		1	3	4	3	1		
4		1	7	6	3		6	
5		8	8	15	24	5	15	
6		5	5	2	11	1	9	
7		4	4	17	4	2	10	
8			8	1	1	1		
9			4		1			
Total		**20**	**43**	**50**	**67**	**13**	**40**	**5**

Bases (mm)								
Phase	**50–100**	**100–140**	**140–180**	**180–220**	**220–260**	**260–300**	**300–350**	**>350**
1		2	3					
2		2	10	3	2			
3					1			
4		1	6	3	2		3	
5	1	3	4	10	15	3	5	1
6		3	1	4	5	2		
7		4	2	8	12	1	8	
8		1	7	2	5		1	
9			1	1	1			
Total	**1**	**16**	**34**	**31**	**43**	**6**	**17**	**1**

Pot thickness

Thick-walled sherds are predominant in phase 1 and only slightly fewer in number than medium-walled sherds in phases 2, 3, and 4. Thereafter sherds are mostly of medium thickness except for phase 6 which has a greater proportion of thick and very thick-walled vessels. Thin-walled pots do not become common until phase 4 and, although few in phases 6 and 8, are otherwise plentiful until phase 9, by which time there is a higher proportion of thin than thick sherds.

Platter thickness

Except for some unusually thick platters in phase 2, most are of medium thickness in phases 1 to 5 and are then thicker in phases 6 to 8. However, the difference in frequency of thick sherds (9mm–14mm) and medium sherds (6mm–9mm) becomes less apparent through the phases. By phases 8 and 9 they occur in almost the same numbers. There is an overall shift towards thicker platters from phases 4 and 5 to phases 6, 7 and 8 although very thick platters are mostly present in phases 2, 4 and 6. Thin platters are only relatively common (11%) in phase 4.

Pot shape

Of the three categories of shape (convex, curved and open), convex profiles are the most common, followed by curved. Open forms, most akin to the pre-Viking styles, remain a sizeable component (between 12% and 25%) of the assemblage until phases 8 and 9 although the method of manufacture was different to the tongue-and-groove construction of pre-Viking forms. Phase 6 represents an anomaly, with curved profiles predominating during a time (between phases 5 and 8) when convex shapes are otherwise by far the most common. Phase 9 is also dominated by curved forms.

Pot diameters

The diameters of rims and bases in phases 1–3 are mostly

Table 12.3. Platter diameters by phase

Phase	100–140mm	140–180mm	180–220mm	220–260mm	260–300mm	300–350mm
1		1	1			
2	1			1		
3						
4						
5		1	2	1	1	
6	2	2	2	4		1
7	1	1			6	3
8	1		1		5	6
9						
Total	**5**	**5**	**6**	**6**	**12**	**10**

restricted to between 140mm–180mm and 220m–260mm, but this may be due to the small size of the sample. An interesting exception is the presence of five rims from phase 2 which are over 350mm in diameter, perhaps evidence of communal cooking in that phase. In phases 4 to 7 (those phases with a reasonable sample size), there is a degree of bimodality in rim diameters, with a range of medium-width pots (initially 140mm–180mm in phase 4, then 220mm–260mm in phases 5 to 6, and 180mm–220mm in phase 7) and a smaller proportion of large pots (300mm–350mm). A similar but less pronounced pattern is also found in the base diameters. The smallest pots (50mm–140mm rim and base diameter) are present from the beginning until phase 7.

There is a wide variety of rim diameters throughout the phases, with a slight tendency towards wider-mouthed vessels from phase 5 to phase 7 (Table 12.2).

Platter diameters

The diameter of platter form vessels, from the surviving rim sherds, shows a movement towards larger diameter platters in phases 6, 7 and 8, though smaller ones are still present (Table 12.3).

Pot bases

Of the three base angle categories (shallow, medium and steep), most pots have steep angles. Medium examples dominate only in the small samples from phases 3 and 9. Shallow angles are only present in phases 6 and 7. Base types are mostly sagging in all phases, except for phase 3 when numbers are low. Rounded basal angles form only a tiny proportion until phase 9 when they are a third of this admittedly small sample.

Finish

Surface finish and rim form are considered under this heading. Pots and platters have broadly different styles of surface finishing, although several techniques are shared between the two.

Pot surface finish

The finish of pot sherds is commonly smooth, wiped and fingered, with other finishes occurring much less frequently. Smoothed and wiped surfaces are generally the most common finishes, in roughly equal proportions, with the latter slightly more dominant (except for phase 4) until phase 7. Rough surfaces and organic impressions vary inversely through time: the former are much more common in the early phases (except phases 2 and 5) and organic impressions become more dominant in phases 7 and 8. Grass-marking, fingered marks and cracked basal surfaces are not present on more than about 6% of sherds in any phase.

Platter surface finish

A number of changes to platter finishes occurs through the phases. Firstly, the percentage of heavily grass-marked sherds increases (until phase 8) whilst the number with cracked exterior finishes decreases. This increase in heavy grass-marking peaks in phase 7 where it has risen to 73%, a contrast to its absence in phase 1. After this peak in phase 7 there is a drop in phase 8 to 42%, showing that heavily grass-marked finishes decline in frequency but are still significant, falling to 15% in phase 9. Cracked finishes fall from 37% in phases 1–3 to just 2%–5% by phases 8 and 9, and there is a gentle increase in sherds with no grass-markings. Interior finishes also change in phase 7. In phases 2–6, fingered interiors dominate whilst in phases 7–9 channelled finishes are more common.

Pot rims

In terms of thickness, medium-walled rim sherds (6mm–9mm) are most common until phase 7, with thick-walled sherds being a little less frequent, and thin-walled vessels

least common. In phase 7 the thin-walled sherds are more numerous: 52% of the rim sherds were found to be thin-walled (<6mm). Thin-walled sherds are still significant (20%) in phase 8, where the majority of rim sherds are again medium-walled. Thick-walled sherds account for only 6% of the rim sherds in phase 7 and 15% in phase 8.

The forms of the rims also alter, with round rims dominating until phase 7 when shallow rounded and flat rounded become more common. With regard to the finish of the rim sherds, the most frequently occurring finish is wiped, which is seconded by a smooth finish. A variety of other finishes were used throughout the phases but only in small numbers.

Platter rims

There are interesting chronological trends in platter rims. Round and flat rims are present virtually throughout the sequence, with flat rims becoming more numerous in phases 7 and 8. Bevelled-in rims do not appear until phase 4 and bevelled-out rims are absent until phase 6.

Firing

The surface coloration of vessel sherds varies from grey/black, to brown/buff to orange/red and even pink. Different colorations may be found on the same surface of the same vessel but quantification of sherds' exterior and interior surface colours gives some idea of chronological changes in firing conditions.

Pots

Most pots have brown/buff exteriors and grey/black interiors. It is only in phases 2 and 8 that there are more sherds with brown/buff interiors. Orange interior and exterior surfaces rarely occur on more than 2% of sherds except in phases 1–3. The apparently higher frequency of orange sherds in the early phases may be due solely to the small sample sizes in these phases rather than to any real difference in firing techniques.

Platters

The colour of the sherd interiors (*i.e.* the top surface of the platter) changes briefly in phase 7. Whereas the dominant colour from phase 4 onwards is grey, orange/red interiors are common in phase 7, where this colour is found in 11% of sherds. Brown/buff is briefly the dominant colour in phase 2 but numbers are low. Exterior colour also undergoes a similar change in phase 7 when orange/red predominates over brown/buff, continuing into phases 8 and 9.

Use

In phase 6, storage vessel sherds are present in a recognizable proportion. For the other phases, it is generally not possible to distinguish between categories of cooking, storage and serving vessels. Those pots whose full profiles can be reconstructed show a variety of forms: small bowls and cups, medium-sized pots and very large jars. It is notable that pots of all sizes and shapes have sooting and residue remains, from the smallest bowl to the largest jar. Rim and base diameters show bimodal size distributions in phases 1, 2, 4, 7, 8 and 9 but a single modal pattern in phases 3 and 5 and perhaps a trimodal one in phase 6.

Yet there seems to be no functional difference between vessel sizes since all show similar signs of use for food production, rather than as tableware. Even the larger vessels appear to have been involved in cooking rather than storage, with in fact no class of vessels for this latter purpose being evident from any phase other than phase 6. It is in this phase that thick-walled vessels are especially common and, at the same time, surface residues from cooking are restricted to just over half of the sherds. Otherwise the general size of sherds allows only for a study of percentages with different surface modification: blackening, sooting, carbonized residues and off-white residues.

Pots

Blackened sherds number 7%–16% of the total assemblage, sooted 8%–36%, those with carbonized residue 6%–14% and those with off-white residue 2%–13%. There are some interesting differences in proportions between phases. Phase 6 stands out most clearly from the rest in having the lowest percentages of blackening, sooting and carbonized residues. Blackening is highest from phase 5 onwards whilst sooting is highest (22%–25%) in phases 3–5. Carbonized residues are higher than 10% only in phases 1–3. Phase 1 has the greatest proportion of off-white residues (13%). Thereafter, off-white residues are mostly under 5%, reaching 6% or above only in phases 6 and 7.

Platters

The frequency of the deposits on the platter sherds changes little through the phases until phase 7, when there is an increase in blackened sherds although they are still not as numerous as sooted sherds.

Platter/pot ratios

There is a steady rise in the proportion of platter sherds to other sherds throughout the Cille Pheadair sequence from phase 1 (5% of the assemblage) to phase 7 (44%) and phase 8 (42%). Except for a decline from 11% to 5% from phase 2 to phase 3, the rise is a steady one. In phase 9 the percentage of platter sherds drops from 42% to 16% but this need not reflect a true downturn in use since the sherd numbers and variety of contexts are small in that phase.

Breakage

The average weight of sherds, calculated by dividing the total weight of sherds in each phase by the number of sherds, shows a clear decline in average sherd weight through time (Table 12.1). The anomalous phase is again phase 6 when average sherd weight (10.5g) is higher than at any time since phases 1 and 2. Average weights in phases 8 and 9 are only slightly higher than in phase 7, the all-time

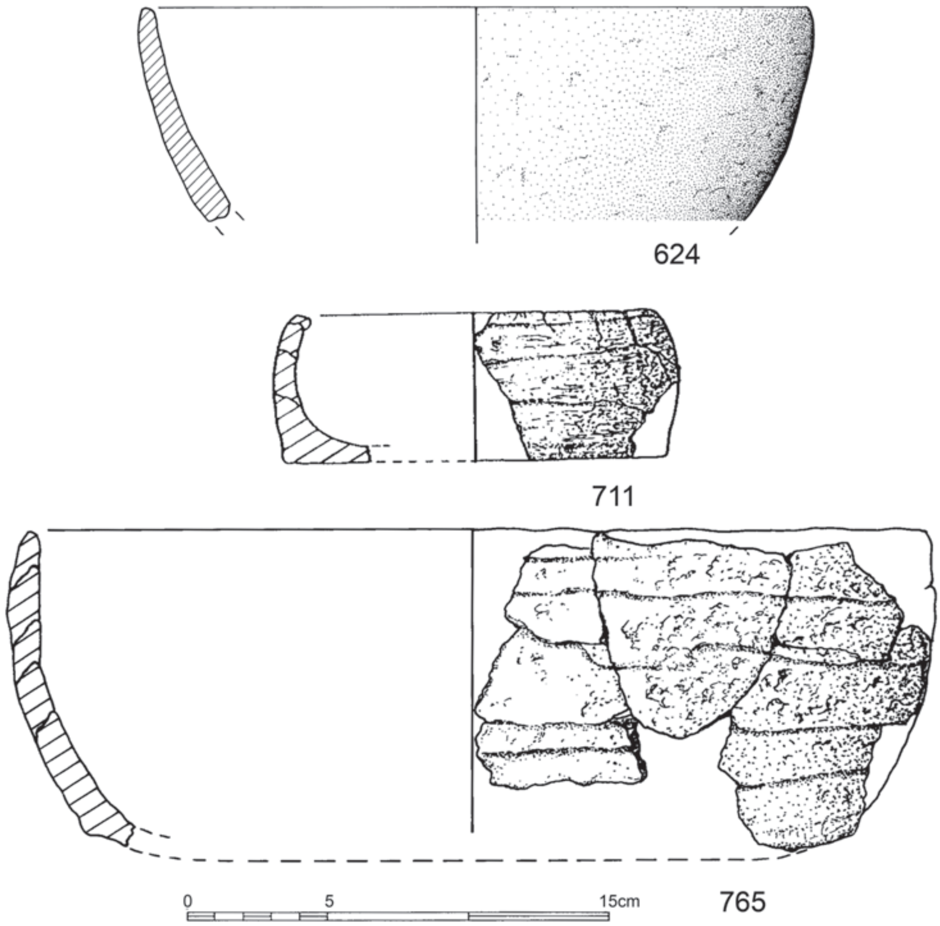


Figure 12.2. Phase 1 pot profiles

low at 5.4g per sherd. One factor which strongly affects this trend in decreasing average weight is the friability of platters. Since these flat vessels were heated directly on the fire, the surviving sherds are very brittle and fall apart into many tiny fragments, and this fragmentation of the platters affects the average sherd weight. When proportions of platter increase, average sherd weight decreases. The exceptions to this rule are phase 6 and phase 9. In phase 9, platter ratios are low but most of the sherds came from heavily trampled floors.

Analysis

The pottery assemblage recovered from the excavations at Cille Pheadair is consistent with a date range covering the Viking Age and Late Norse period. Some 9,395 sherds were recovered, of which almost one-third are from platter form vessels. A further third of the assemblage is from convex bowls and upright, slightly flaring vessels. The remaining third of the sherds are too small to identify to vessel type (though no platter sherds are included in this final third, as even the smallest of these sherds is identifiable).

A variety of changes occur in the assemblage throughout the life history of the site. The platters are particularly sensitive as indicators of chronological change, in terms of the percentage of platter in each phase's assemblage, their rim forms and, to a lesser degree, their surface treatment and colour.

In general terms, the platter sherds show a movement from smaller diameter vessels with lightly grass-marked or cracked exteriors, commonly sooted, with finger-impressed interiors, sometimes stabbed or pierced, towards larger diameter vessels with heavily grass-marked exteriors and finger-channelled interiors, again sometimes stabbed or pierced.

Before phase 4 there was no consistent selection of either side of the platter for reduced or oxidized surfaces but thereafter the interior (top side) is most frequently the reduced surface, perhaps indicating a more standardized method of stacking the plates for firing. Finally, the appearance of bevelled-in rims after phase 3 and of bevelled-out rims after phase 5 may be significant chronological markers.

The remainder of the pottery, consisting of curved/convex bowls and upright flaring vessels, also appears to undergo a number of changes, occurring at roughly the same time as those affecting the platters.

Vessel diameters, calculated from rim and base sherds, show no clear chronological pattern such as that exhibited by the platter sherds, with most vessel diameters lying between *c.* 180mm–260mm, though of note is the occurrence of very large rim diameters in phase 2. Very

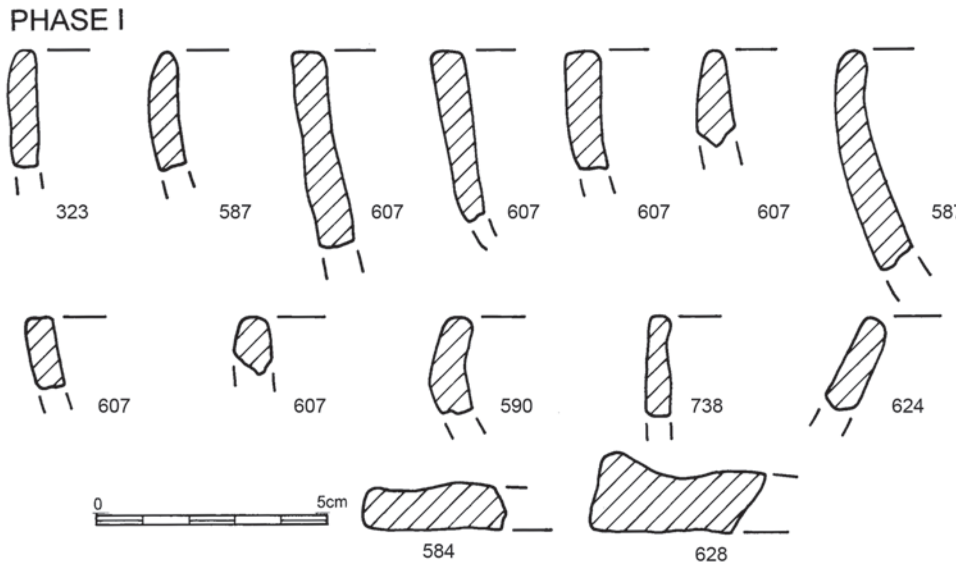


Figure 12.3. Phase 1 rim forms

Table 12.4. Phase 1 platters

exterior finish				interior finish							thickness			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
3		6	1			6						9	1	1
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
	2			9	2			1	4	6		5	2	

large and very small basal diameters were recorded only in phase 5.

In general, the early phases are characterized by convex vessels, mostly with sagging bases. The vessels had generally thick walls, with oxidized brown exteriors and reduced grey interiors, with the exception of the rim sherds which are commonly brown. Vessel finishes are mostly wiped and less commonly smoothed. Sherds are mostly sooted, infrequently with grass-marking, with a variety of diameters across the range except that the smallest vessels are absent. The most common rim type until phase 7 is round.

Whilst brown remains the main exterior colour, interiors begin to change, with grey becoming more frequent in the rim sherds, and brown increasing in frequency in the body sherds. Base sherds keep their grey interiors. Medium-wall thickness sherds become commonplace and thin sherds become a small but significant proportion in phase 4. There is also an increase in the number of open rims appearing in the assemblage.

By the later phases (7 and 8), more changes can be noted. Curved/convex vessels and open/flaring vessels appear in roughly equal proportions, of similar diameters to the earlier phases and still predominately with sagging bases. Footed bases are a minor proportion of most phases. The finish remains most frequently smoothed and wiped and the external colour remains brown. Sherd wall thickness appears to have moved towards a parity between medium- and thick-walled vessels, whilst sooting decreases and blackening increases, in a similar fashion to that shown by the platter sherds. Changes in rim profile also occur: the most common rim type becomes the shallow round rim in phase 7, and the flat rim with rounded corners in phase 8.

Phase 1

The pottery from phase 1 is illustrated in Figures 12.2 and 12.3.

Platter

There are 11 platter ware sherds from phase 1 (Table 12.4). Only two are rim sherds, both with a flat profile. The two platter rim sherds gave diameters of 140mm–180mm and 180mm–220mm (Table 12.3). The commonest form of exterior finish is for sherds to have no grass-marking with light grass-marking next in frequency. Half of the platter sherds have channelled grooves on their interior. Sherd thickness is mostly medium. Exterior colours are mostly orange and brown and interior ones are mostly grey. In terms of deposits or residues, most of the platter sherds are blackened.

Rims

There are 24 rim sherds in phase 1, with 19 of the commonest A fabric, three of the B fabric (larger chunky

Table 12.5. Phase 1 rims

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
19	3			1						1	12	10		15		4	5
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
16	5	3		11	7	3			18	6	6	3	3	5			4
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
14		6	3						1			1		6	1		

Table 12.6. Phase 1 bases

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
21		3				1			1	3		22	1	5			21

angle				interior colour				exterior colour				finish						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	4	11		11	4	7	1	10	12	4		2	1	3		4	5	6

type					diameter								deposits			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
4	22		4			2	3						7	21	13	7

Table 12.7. Phase 1 body sherds

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
38	1						1		5		12	30	3	16	12	1	16
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
19	19			7	25	2		18	42	11	15	2	3	15			6

grits) and one of E fabric (Table 12.5). Fifteen sherds come from convex vessels and four from open or flaring ones. The thickness of rim sherds is entirely in the medium and thick categories, with the exception of one thin sherd. Most rims have a round rim form and others are shallow round and flat with rounded corners. The colour of sherd interiors and exteriors is mostly grey, with a high number of buff/brown exteriors. Surface finish is equally spread between smooth, wiped, rough and fingered. The eight measurable rim diameters are most numerous in the size category 220mm–260mm (Table 12.2).

Bases

There are 26 base sherds in phase 1 (Table 12.6). Of these the majority are A fabric with just three of C and one of F fabric. The most common thickness for sherds in this phase is thick, 9–14mm, with just three thin sherds and one very thick. Five sherds are convex, probably from convex bowls. The basal angle is most commonly steep, with four examples of medium-angle sherds.

The interior colour of these base sherds is quite mixed; most are grey, followed by orange/red, buff/brown and pink/purple. The most common exterior colours are brown and grey with some orange/red. The surface finish of the vessels is also mixed, with most of them cracked, fingered and grass-marked. The most common type of base in this phase is the sagging base, but there are four flat and four footed bases. The basal diameters for this phase all fall within 100mm–180mm (Table 12.2). Most of the sherds have heavy soot deposits and half have carbonized residue. A quarter have been blackened, and a quarter have off-white residue.

Body sherds

There are 45 body sherds in phase 1 (Table 12.7). The majority of these sherds are of A fabric, with just one of B fabric and one of H fabric. Thick-walled sherds (9mm–14mm) are most common (53%), with the rest medium except for just three very thick. Convex bowls are the most common form identified, closely followed by curved, with just one sherd from a flaring/open bowl. The interior colours of the body sherds are evenly divided between grey and brown/buff. The exterior colour of the body sherds is dominated by brown/buff-coloured sherds, with seven grey sherds and just two orange/red. Nearly all sherds have sooting deposits and 18 have blackening, 15 off-white residues and 11 carbonized residue. The finish on most body sherds is rough (15), followed by fingered, wiped and smoothed.

Table 12.8. Phase 2 platters

exterior finish				**interior finish**							**thickness**			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
6	7		18	52				2		1			15	14
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
5				3	24	1	1		11	8	5	2	39	6

Table 12.9. Phase 2 rims

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
30	2	1?	1		2				12		25	19		1	18	1	28
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
4	26	8		20	14	9	1	9	33	12	5	8	15	2	4		
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
32	3				1	1		1	10		1	3	5	14	2		5

Phase 2

The pottery from phase 2 is illustrated in Figures 12.4 and 12.5.

Platter

There are 52 platter sherds from phase 2 (Table 12.8). Five are rim sherds, all with a round profile. Two platter rim sherds gave diameters of 100mm–140mm and 220mm–260mm. The commonest form of exterior finish is for sherds to have cracked surfaces, with smaller proportions of heavy and light grass-marking. Most of the platter sherds have fingered interiors; just two have stabbed holes and one has seed impressions. Sherd thickness for this phase is almost equally thick and very thick. Exteriors are mostly brown/buff, followed by orange and then red. Interiors are predominantly brown/buff, with three grey and one each of orange and red. In terms of deposits or residues, most sherds are sooted, only six have adhering carbonized residue, and two are blackened.

The platter sherds include a number of very thick examples, a type more frequent in this phase than in any other. This suggests that assemblages with a high proportion (almost 50% in this case) of very thick platter sherds are earlier. Platter rims tend to have a rounded finish to their edge, which matches the predominant finish to the other vessel rims in phase 2.

Rims

Forty-eight sherds were identified as rim sherds, with 30 of the commonest A fabric, two of the B fabric (larger chunky grits) and four of the other less common fabrics (Table 12.9). The small size of most of the rim sherds means that the vessel form can only be classed as curved (18 sherds), with only one rim each from convex and open/flaring vessels. The majority of the curved sherds are probably from convex bowls, as their shape does not seem appropriate for any of the other known vessel forms for a Norse-period Hebridean pottery assemblage.

The thickness of rim sherds is restricted to the medium and thick categories. Most rims have a round rim form and just three are flat, with single examples being everted, slightly everted and expanded/lipped. Sherd interiors are mostly brown/buff, with a few orange/red and grey. Exteriors are mostly grey, followed by brown/buff and then orange/red with one pink/purple sherd. Surface finish is mostly wiped with fewer examples of smooth, organic-impressed and rough surfaces. Thirty rim sherds provided diameters, with 14 being 220mm–260mm; five of the rim sherds are from very large vessels.

Base sherds

There are 74 base sherds in phase 2 (Table 12.10). The majority are A fabric, with two of C fabric and one of G fabric. The most common thickness for sherds in this phase is thick, 9mm–14mm, with 16 medium and one thin sherd. The form of the vessel could not be identified from many of the sherds as they are too small, but 12 are curved, probably all from convex bowls. The basal angle, where discernible, is most commonly steep, with three examples of medium-angle sherds. The interior colour of these sherds is mostly grey, with a slightly smaller number brown and two orange/red. The most common exterior colour is brown, with many fewer sherds being orange/red and finally grey. The surface finish of the vessels is mixed, with sherds having smooth, fingered, organic impressed, wiped and rough finishes.

The most common type of base in this phase is the sagging base but there are sizeable numbers of flat and

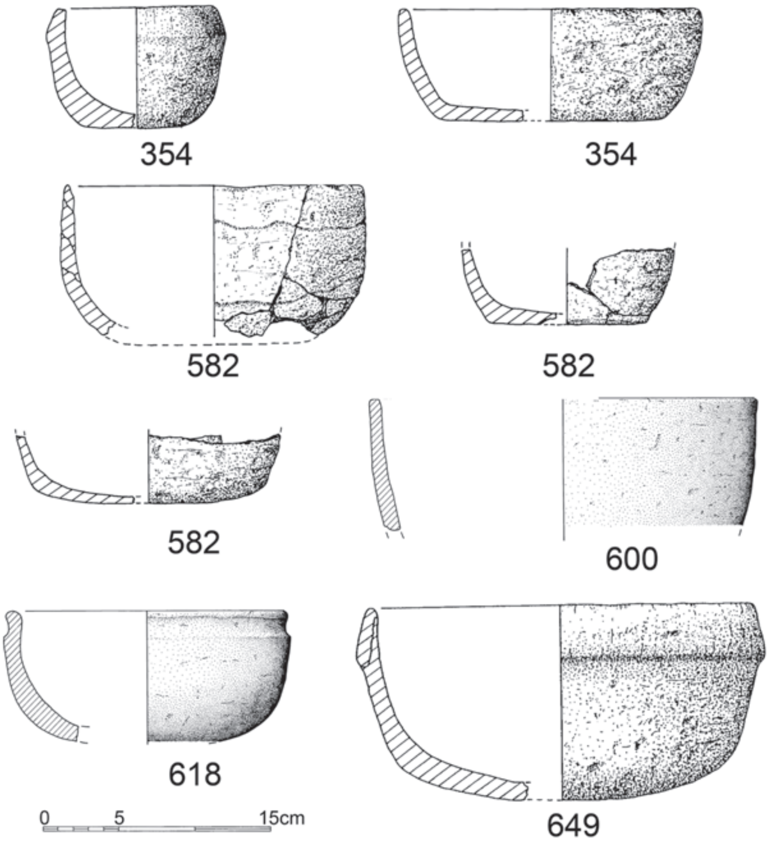


Figure 12.4. Phase 2 pot profiles

Table 12.10. Phase 2 bases

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
44		2				1			16	1	16	33			12		51

angle				interior colour				exterior colour				finish						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	3	28	43	21	17	2		4	23	6		11	7	5	8		9	

type					diameter								deposits			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
21	31		19			2	10	3	2				31	38	28	2

footed bases. Only 17 basal sherds could provide a measure of their diameter, with the great majority falling in the range 140–260mm. Half of the sherds have heavy soot deposits, with slightly fewer blackened and with carbonized residue; two sherds have off-white residue.

Body sherds

There are 74 body sherds in phase 2 (Table 12.11). The majority of these sherds are of A fabric, with eight of G fabric, three of B fabric, and one each of C, D, E, F fabrics. Medium-walled sherds (6mm–9mm) are most common (*n*=34), whilst there are 10 thick-walled sherds (9mm–14mm). Convex bowls are the most common form identified, and eight sherds are from open/flaring vessels. The interior colour of the body sherds is mostly brown/buff, with grey the next commonest and then orange/red. Only one sherd has a pink/purple interior: this sherd and one rim sherd are the only sherds of this colour noted from phase 2. The exterior colour of the body sherds is dominated by brown/buff-coloured sherds, but 14 orange/red sherds are present and only four sherds are grey.

Many sherds have deposits and/or residues adhering to either or both of their surfaces. Sooted deposits are the most common, found on 17 sherds, followed by blackening (*n*=14) and carbonized residue (*n*=9). The finish on ten body sherds is wiped and the rest have smooth and rough finishes, with one sherd with organic impressions.

Phase 3

The pottery from phase 3 is illustrated in Figures 12.6 and 12.7.

Platter

There are only seven sherds of platter in phase 3, of which

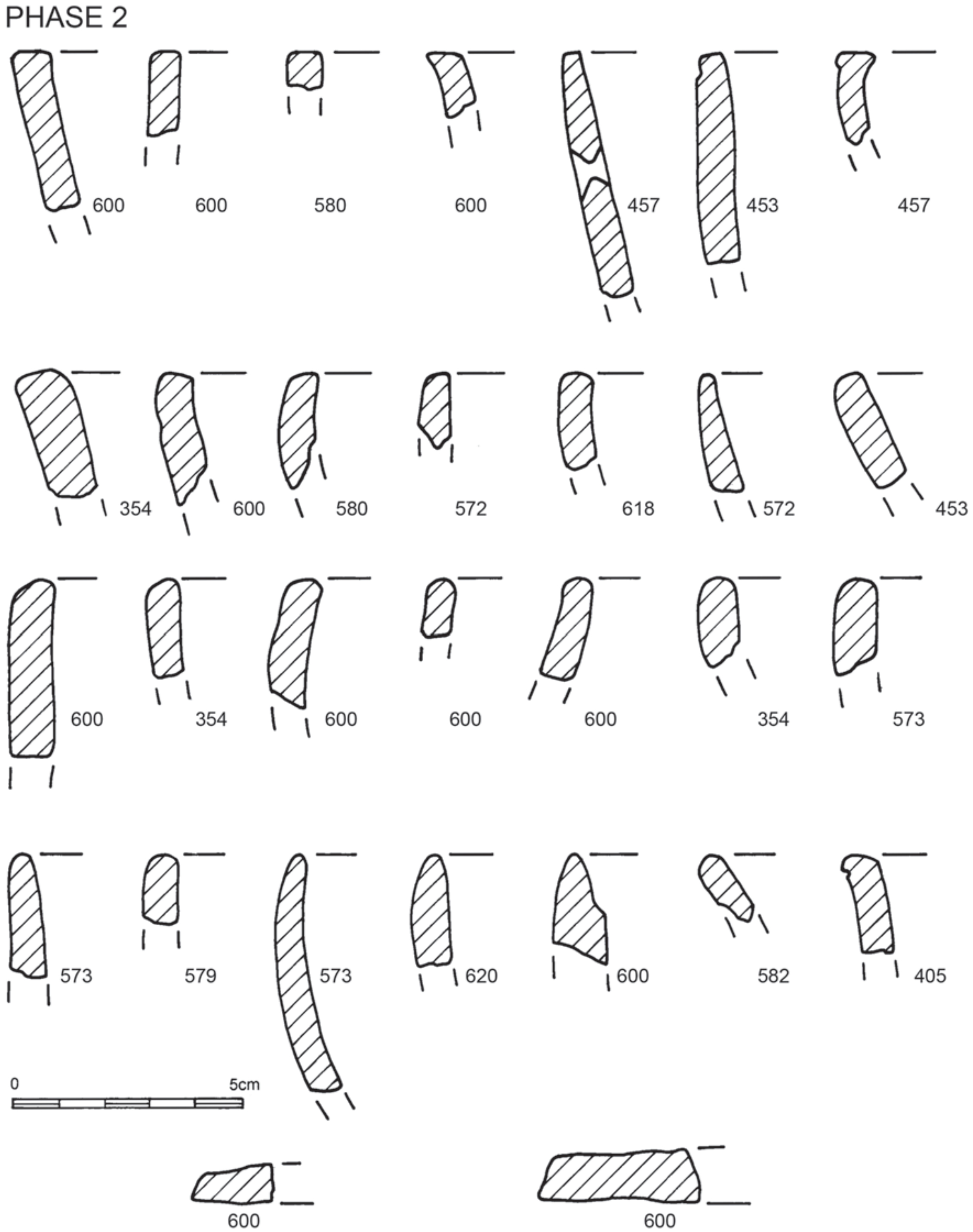


Figure 12.5. Phase 2 rim forms

two are rims (round and flat). The sherds have a variety of exterior finishes, mostly being finger-impressed, and are fingered on the interior (Table 12.12). Two sherds are thick and five are medium. Colours are varied on both surfaces, with only red absent. Some of the sherds are sooted and have carbonized residues.

Rims

There are 17 rim sherds recorded in phase 3 (Table 12.13). The majority of these are A fabric (n=13), with one of G and two of H fabric. Rim type varies, with half the sherds being round and the remainder shallow round, flat, and flat with round corners. There are three examples of expanded rims and one tapered rim. Diameters fall within 100mm–300mm, centred on 180mm–220mm. With regard to vessel form, the identifiable sherds are split equally between convex and open/flaring pots.

Nearly all sherds are of medium thickness, with one thin

Table 12.11. Phase 2 body sherds

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
42	3	1	1	1	1	8			17		34	10		34		8	32
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
10	18	6	1	4	20	14		14	17	9		7	10	3	1		

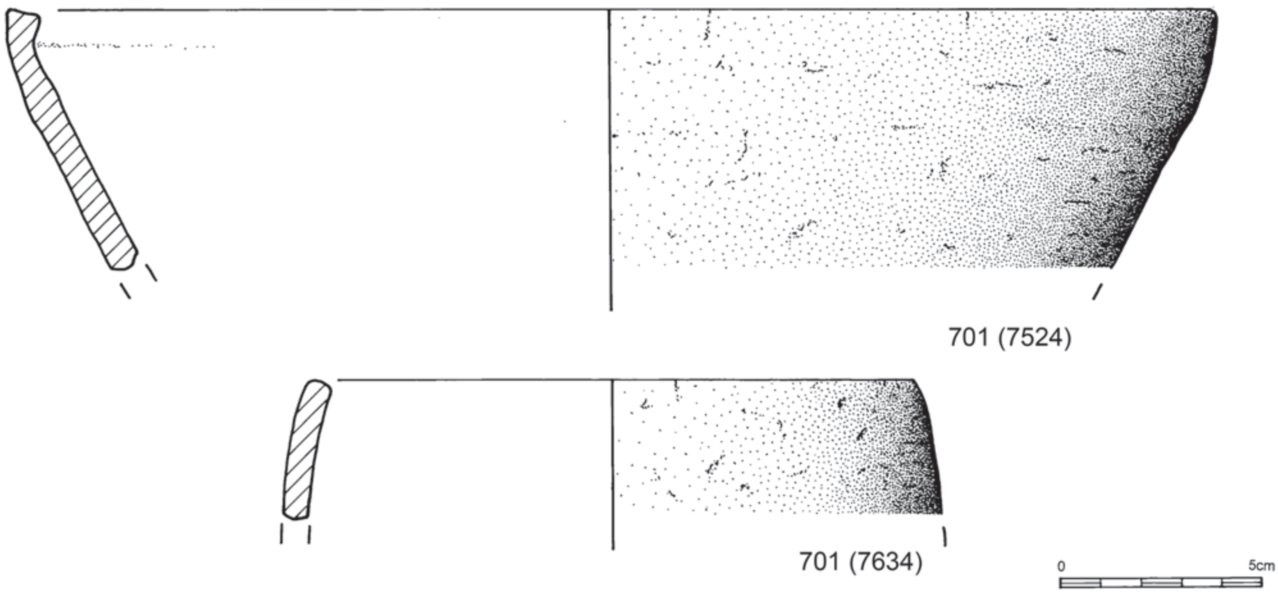


Figure 12.6. Phase 3 pot profiles

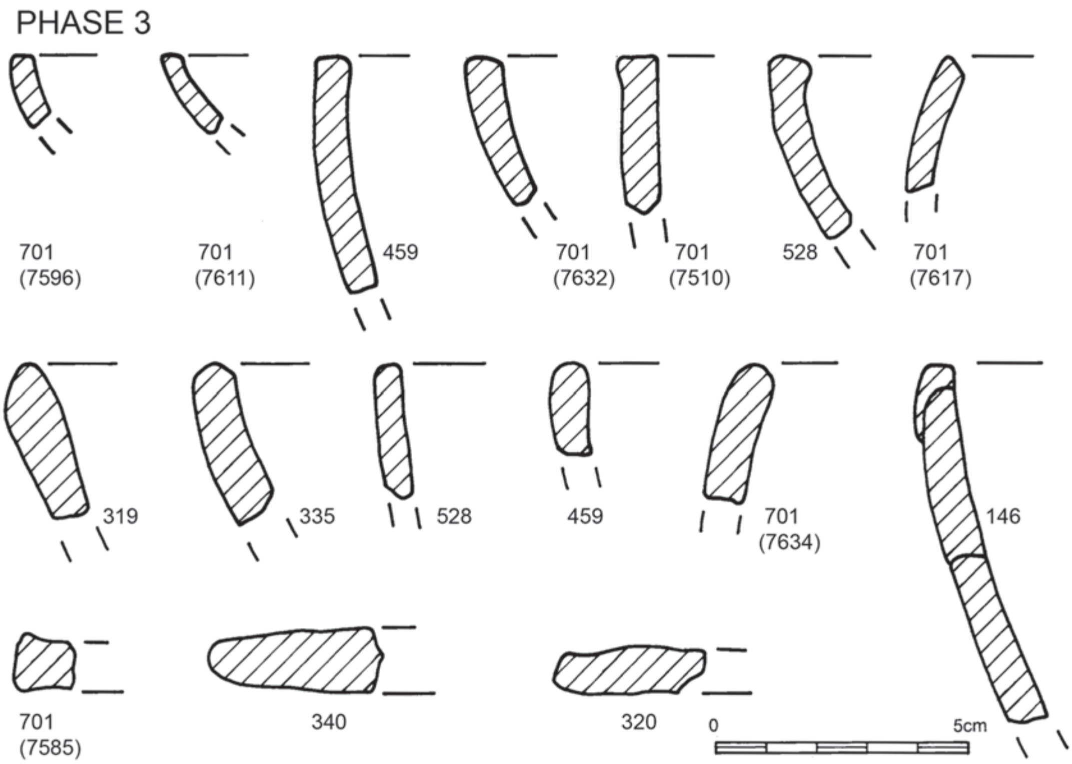


Figure 12.7. Phase 3 rim forms

Table 12.12. Phase 3 platters

exterior finish				interior finish							thickness			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
3	2	2		2	3				1			5	2	
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
1	1			3	3	1		1	5	1			3	2

Table 12.13. Phase 3 rims

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
13						1	2		1	1	13	3		6		6	5
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
6	9	1		2	8	1		1	12	6	2	2	5	1	1		3
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
8	2	4	2	1				3			1	3	4	3	1		

Table 12.14. Phase 3 bases

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
12	1					1			15		9	7					29

angle				interior colour				exterior colour				finish						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	5	2	1	8	1			8	6		1	2	1	3		1	1	

type					diameter								deposits			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
8	5		3	2					1				6	8	6	

and three thick. The interior colour is brown in the main, with some grey interiors present. The exterior colour of these sherds is most commonly brown, with a few being grey. Most of the sherds have deposits of soot, with six sherds showing deposits of carbonized residue, and two sherds a deposit of off-white residue. External finish varies, with wiped, fingered, smooth, rough and organic-impressed surfaces present.

Base sherds

There are 29 base sherds in phase 3 (Table 12.14). Most are of A fabric, with one of B and one of G fabric. Sherd thickness is divided almost equally between medium (6mm–9mm) and thick (9mm–14mm). None of the vessel forms could be distinguished. The angle of the base sherds is mostly medium, with two being steep. Interior and exterior colours are mostly grey, whilst six exteriors are brown. There is a wide range of finishes; rough, smooth, wiped, grass-marked and fingered. In this phase there are more flat bases than sagging bases. Footed and rounded bases are also present. Only one diameter could be established, 220mm–260mm. Around a quarter of all sherds have soot deposits, six have been blackened and six have carbonized residue.

Body sherds

There are 30 body sherds in phase 3 (Table 12.15). The majority of these are A fabric (*n*=20), with one sherd of B, two of E, three of G and two of H fabric. The most common thickness is thick-walled (9mm–14mm), followed by medium-walled (6–9mm) and there are three very thick sherds. There are equal numbers of convex and curved body sherds, indicating convex bowl forms. The most frequent interior colour is grey, closely followed by brown/buff and some orange/red; there is one pink/purple sherd. Exteriors are mostly brown with six grey, two orange/red and one pink/purple. Most of the sherds are sooted and there are also eight blackened sherds, eight sherds with carbonized residues and six with off-white residues. Finishes are mostly rough and wiped.

Table 12.15. Phase 3 body sherds

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
20	1			2		3	2		1		11	16	3	6	6		17
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
15	11	3	1	6	13	2	1	8	16	8	6	1	4	8			1

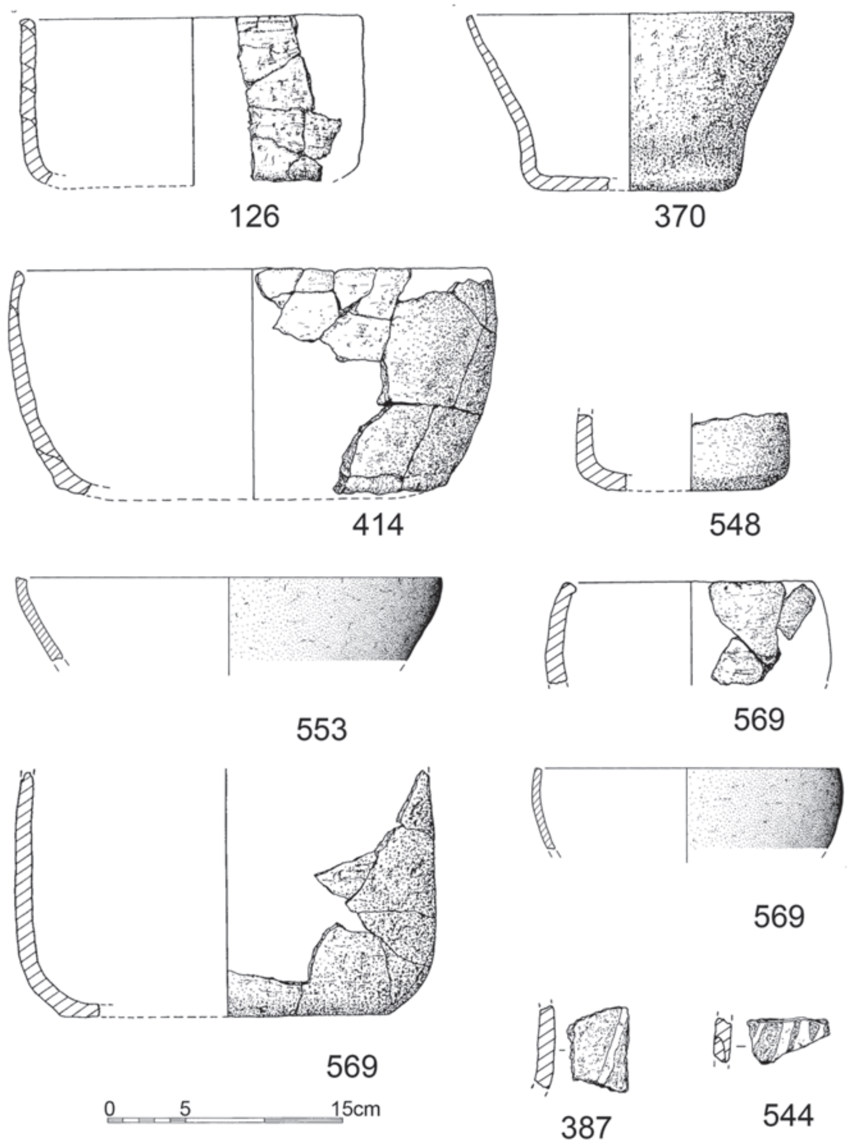


Figure 12.8. Phase 4 pot profiles

Phase 4

The pottery from phase 4 is illustrated in Figures 12.8–12.11.

Platter

There are 322 sherds of platter from phase 4 (Table 12.16). Of the 28 rims, nearly equal numbers are flat, round and bevelled inwards. None gave a diameter, given their small size and worn condition. The commonest exterior finish is the use of light grass-marking, with a slightly lower number of sherds having heavy grass-marking. Sixty-nine sherds have no grass-marking and just 20 are cracked. The most common interior finish is fingered, followed by fingertip impressions. The thickness of the platter sherds is mostly medium, followed by thick. All but a few interiors are

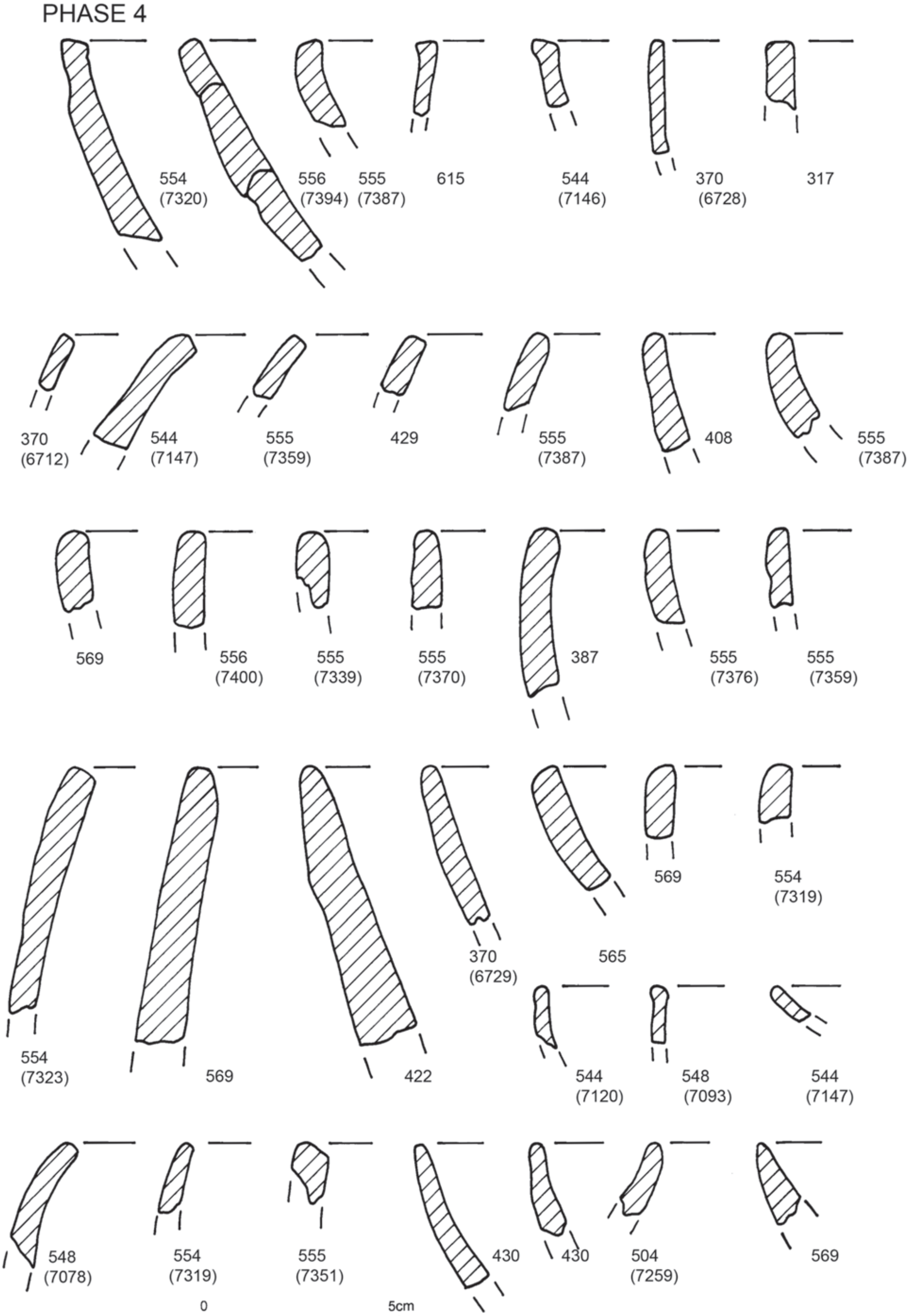


Figure 12.9. Phase 4 rim forms

Table 12.16. Phase 4 platters

exterior finish				**interior finish**							**thickness**			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
136	96	69	20	90	51	5	14	16	58	12	35	180	96	10
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
9	11	8		294	25	2	1	36	157	117	4	15	102	5

Table 12.17. Phase 4 rims

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
89	7	5	10	6		12	16		1	37	92	21	2	19	36	18	51
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
78	54	16	1	54	57	16	1	28	103	23	15	41	42	39	15	6	20
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
59	35	34	23		1	2	3	16	1		1	7	6	3		6	

Table 12.18. Phase 4 bases

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
54	16	7	2	2	2	1	12	3	12	12	47	48	1	1	1	6	84

angle				**interior colour**				**exterior colour**				**finish**						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	10	26	63	56	26	9		27	54	13		20	16	25	5	3	12	19

type					**diameter**								**deposits**			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
37	52	1	23	10	1	6	3	2		3	1	6	40	82	38	12

grey whereas exteriors are mostly brown/buff and orange. Nearly one-third of platter sherds have a heavy soot residue.

Rims

There are 152 rim sherds in phase 4 (Table 12.17). The majority are of A fabric, with the other sherds evenly mixed in fabric; only F and I are not represented. Where identifiable, most sherds are from curved vessels, with the remainder split between convex and open/flaring shapes. Thus most sherds (convex and curved) derive from convex bowls. Rim types are mixed: although round rims dominate, there are high numbers of flat, shallow round and flat with round corners rims. Rim diameters range from 50mm–100mm to 300–350mm. The most common thickness for the phase 4 rims is 6mm–9mm (medium) but thin rims become a major element in this phase.

With regard to colour, the most common interior colour is grey followed by brown, whilst exterior colours are equally split between brown and grey. Almost all the sherds are sooted, with just 28 sherds blackened, 23 with carbonized residues, and 15 with off-white residues. The finish of the sherds is largely mixed. The most common finishes are wiped, smooth and rough.

Base sherds

There are 114 base sherds in phase 4 (Table 12.18). Most are A fabric, but B and H fabrics occur in quite high proportions. The most common thickness in this phase is jointly medium and thick (83% of the base sherds), followed by thin. Most of the sherds could not be identified to vessel form, but six are open/flaring. A steep angle was noted on 26 sherds and a medium angle on only 10. Most interiors are grey and most exteriors are brown. All categories of finish are represented, with most of the sherds being rough, smooth and cracked. Bases are mostly sagging but with a good proportion of flat examples. Footed and rounded bases are also present. Most sherds have heavy soot residues and many have blackening and carbonized residues.

Body sherds

There are 302 body sherds in phase 4 (Table 12.19). The majority of sherds are of A fabric, with quite high numbers

Table 12.19. Phase 4 body sherds

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
190	36	1	2	3	`	6	29		35	22	121	149	1	68	39	32	89
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
216	51	17		54	140	29	3	75	227	62	65	52	50	84	4	6	62

Table 12.20. Phase 5 platters

exterior finish				**interior finish**							**thickness**			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
46	276	180	86	400	34	53	67	34	6	1	2	516	91	
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
7	1	27		517	73	11	3	39	302	214	1	70	607	1

Table 12.21. Phase 5 rims

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
94	5	12	3	4	1	2			11	11	96	35			34	30	94
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
58	59	18		21	48	11	9	48	131	26	3	31	36	8	20	1	12
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
38	16	37	34		1	1		1			8	8	15	24	5	15	

of B and H fabric sherds. All fabrics except I are present. Thick-walled sherds are most common, closely followed by medium-walled sherds. There are a few thin-walled sherds. Convex forms predominate, with equal numbers of curved and open/flaring shapes. Interior colours are mostly grey and exteriors mostly brown. Nearly all of the sherds are sooted, with smaller but almost equal proportions of other residues. Rough, fingered, smooth and wiped surfaces are the main forms of finish.

Phase 5

The pottery from phase 5 is illustrated in Figures 12.12–12.15.

Platter

There are 604 platter sherds in phase 5 (Table 12.20). Almost half of this total is made up of heavily grass-marked sherds and more than a quarter have no grass-marking. On the interior, most have fingered impressions. The great majority of the sherds are of medium thickness; only two are thin. Bevelled-in rims are the most common, with the rest round except for one flat rim. Grey is the most dominant interior colour and brown, closely followed by orange, is the main colour of the exterior. Most of the sherds are sooted and 70 are blackened. There are five reconstructable diameters, spread between 140mm–180mm and 260mm–300mm.

Rims

There are 142 rim sherds found in phase 5 (Table 12.21). The majority of these are of A fabric, with 12 of C fabric and examples of all other fabrics except H and I. The most common sherd thickness is medium-walled (6mm–9mm), with the rest thick-walled and just 11 thin sherds. The small proportion of identifiable vessel forms is split between curved and open/flaring. The dominant interior colours are equally brown and grey, with the remainder orange/red. The exterior colour of most sherds is brown, followed by grey and finally orange/red and pink/purple.

Most of the sherds are sooted, with 48 blackened, 26 with carbonized residues and just three with off-white residues. The most usual finishes are wiped and smooth, followed by organic impressions. One of the sherds is grass-marked, though grass-marking is more evident (and explicable) on vessel bases. Round and shallow round rims are most common, followed by flat with round corners. Vessel diameters from rim sherds were recorded in all but the very smallest and very largest size categories, with most lying between 180mm–260mm.

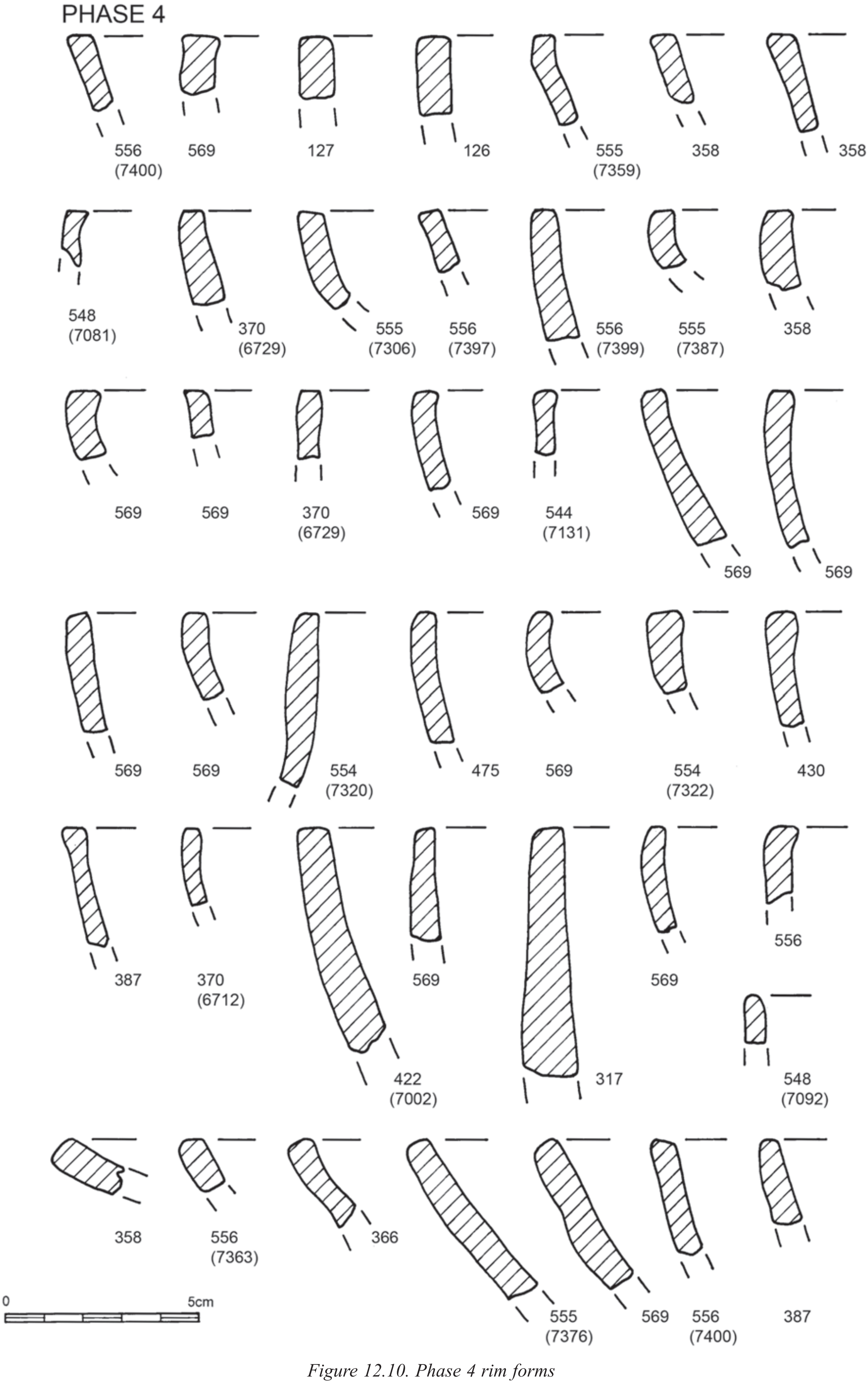


Figure 12.10. Phase 4 rim forms

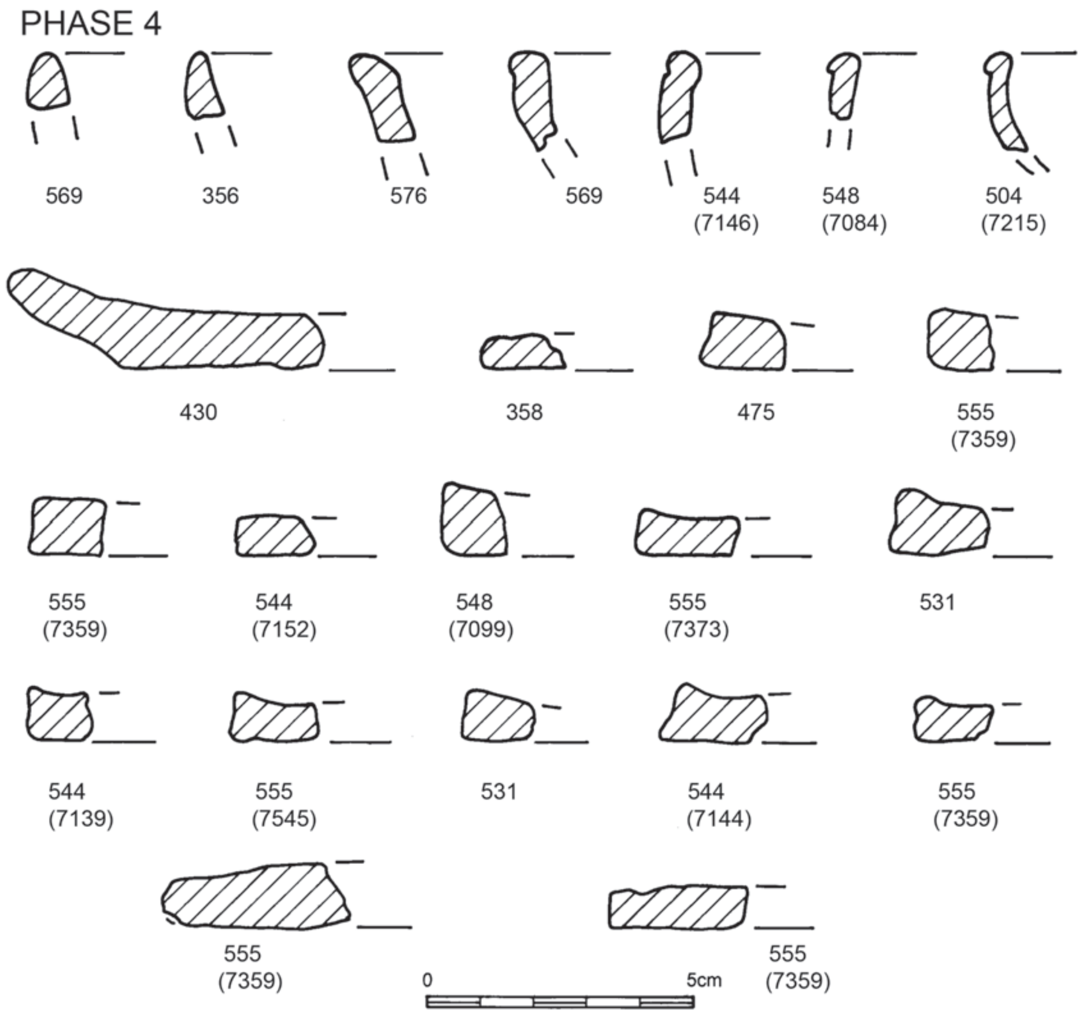


Figure 12.11. Phase 4 rim forms

Base sherds

There are 202 base sherds in phase 5 (Table 12.22). The majority are A fabric, with 13 being C fabric and the remainder B, D, E, F and H fabrics. Sherds are almost equally divided between thick and medium, with just four thin ones. Where form could be worked out from the base sherds, four are from curved and two from open/flaring vessels. Basal angle is most frequently steep, followed by medium but the proportion identifiable is small. The small number of form/shape and basal angle identifications is certainly due in part to the construction method of coil-banding with angle-slab joins. This makes the pot inherently weak, so that it frequently fractures on the joins, especially at the join between the base and the wall.

The most frequent interior colour is grey, followed by orange/red and then brown. The exterior colour is most frequently brown, followed by orange/red and then grey. Finishes to the surface are commonly smooth, followed by fingered and organic impressions, with all but cracking represented. Most bases are sagging, with the remainder flat except for a single omphalos shape. Footed variants are also fairly common. Most of the bases are sooted, blackened and covered with carbonized residue but only 24 have off-white residue. The 42 basal diameters spread across the whole range of size categories, with most grouped between 180mm and 260mm. This closely matches the rim diameters in phase 5.

Body sherds

There are 360 body sherds in phase 5 (Table 12.23). The majority of these are A fabric, with 31 of B fabric and all other fabrics present except for I. Sherds of medium thickness are most common, with 14 thin and only four thick sherds. The vast majority of vessel sherds are of convex form, with just 22 of open/flaring shape. Interior colours are grey and brown, with 21 orange/red and 10 pink/purple sherds. The commonest exterior colour is brown, followed by orange/red, grey and then pink/purple. Most vessel finishes are wiped, followed by smooth, organic impressions and fingered. Nearly all of the body sherds have soot residues and blackening is frequent. Carbonized residues are common and there is a good proportion of off-white residues.

Table 12.22. Phase 5 bases

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
116	1	13	5	1	3		2		1	4	81	84			4	2	196

angle				**interior colour**				**exterior colour**				**finish**						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	11	26	141	68	8	34		11	59	26		35	12	2	20	10	20	

type					**diameter**								**deposits**			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
48	77	1	19		1	3	4	10	15	3	5	1	102	113	89	24

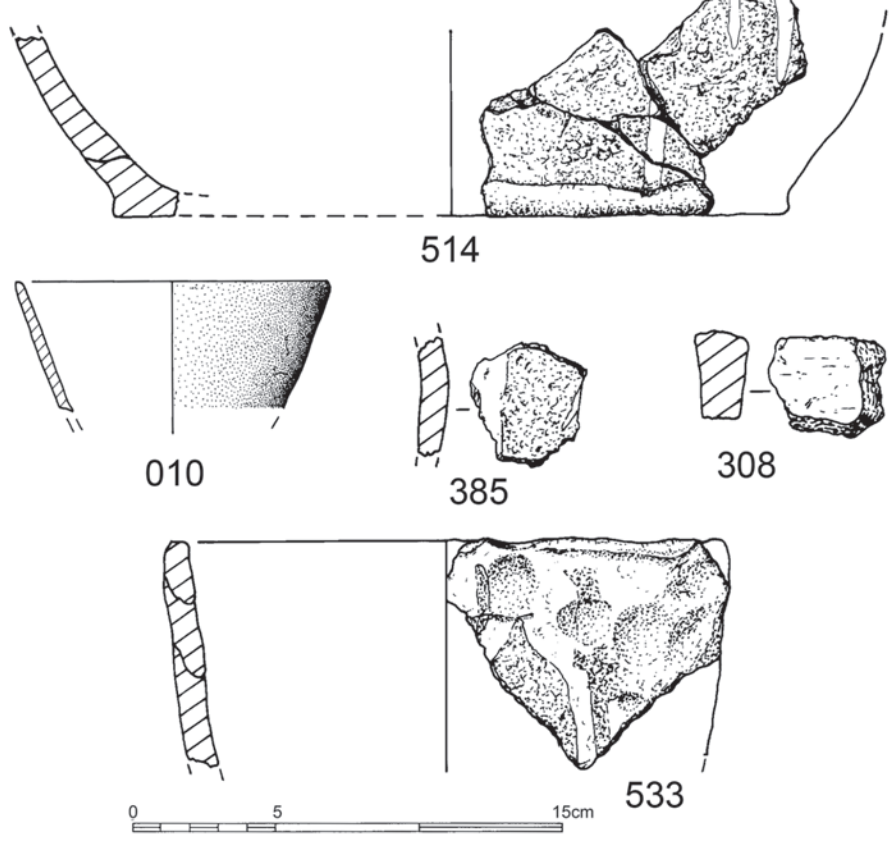


Figure 12.12. Phase 5 pot profiles

Phase 6

The pottery from phase 6 is illustrated in Figures 12.16–12.18.

Platter

There are 344 platter sherds in phase 6 (Table 12.24). Over half of this total is made up of heavily grass-marked sherds; much smaller numbers of sherds have light grass-marking, followed by no grass-marking. On the interior, most are fingered, followed by stabbing and finger impressions. The majority of the sherds are thick. Round and bevelled-in rims are the most common, with bevelled-out rims appearing in low numbers for the first time. Grey is easily the most common interior colour whilst brown, followed equally by grey and orange, is the main colour of the exterior. Just a few of the sherds are sooted and a handful have carbonized residue. There are 11 reconstructable diameters, spread across the size categories. This is the first phase in which platters of the largest size, 300mm–350mm, occur.

Rims

There are 76 rim sherds in phase 6 (Table 12.25). The

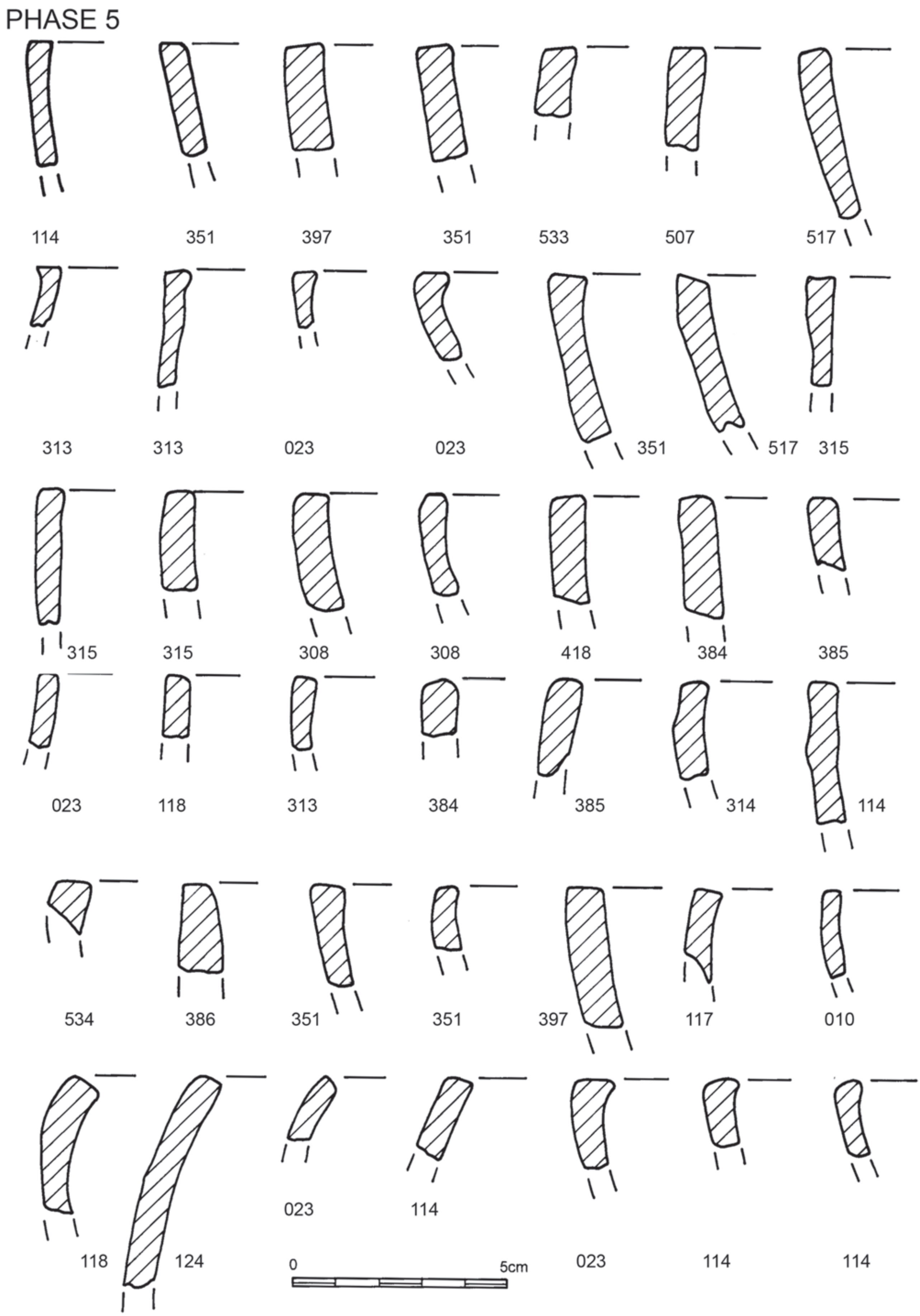


Figure 12.13. Phase 5 rim forms

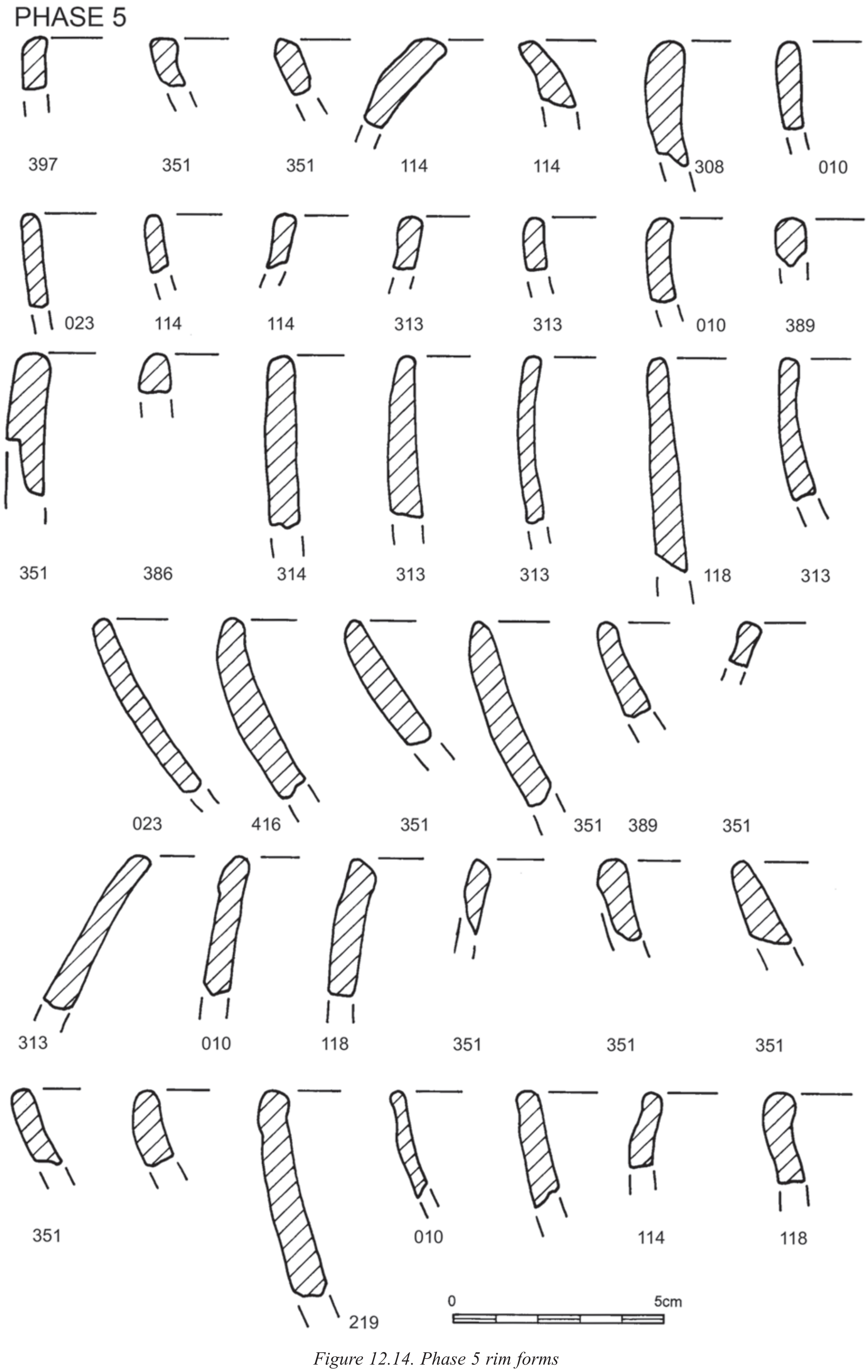


Figure 12.14. Phase 5 rim forms

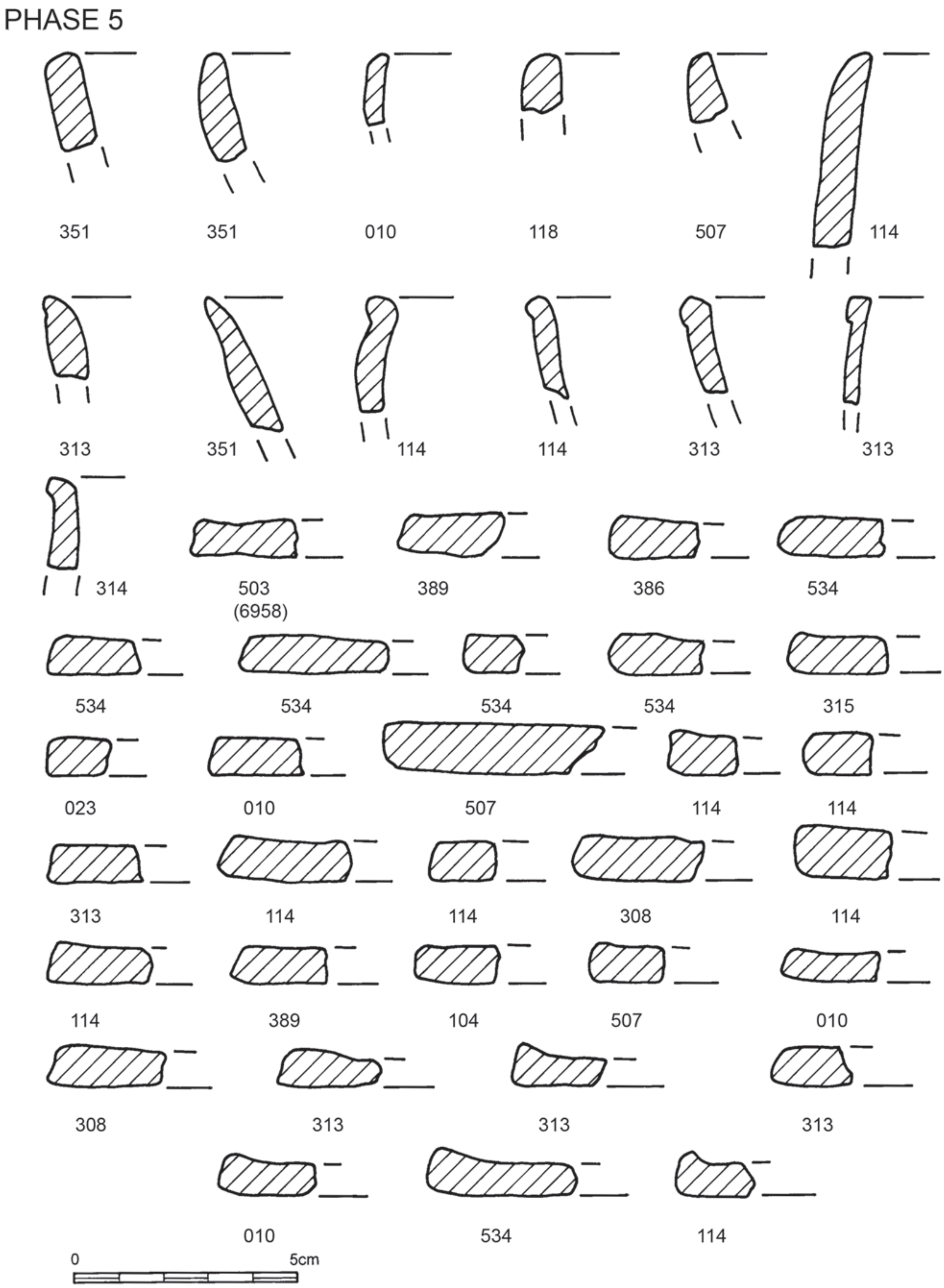


Figure 12.15. Phase 5 rim forms

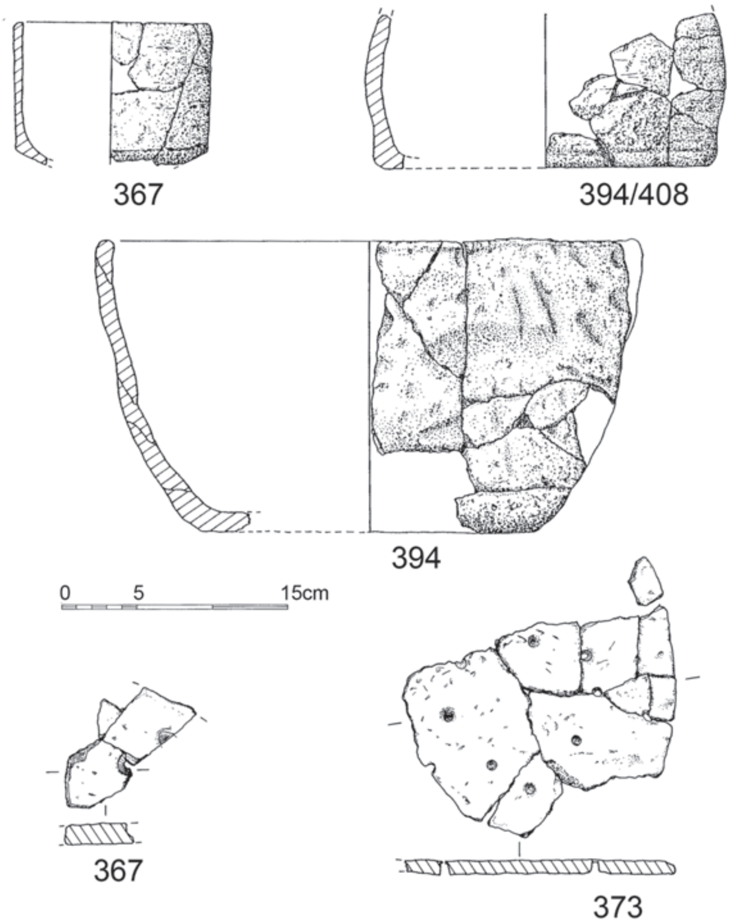


Figure 12.16. Phase 6 pot profiles

Table 12.23. Phase 5 body sherds

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
246	31	9	9	4	2	5	4		5	14	96	4		196		22	142
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
163	110	21	10	16	118	42	9	193	301	95	46	73	105	4	69	3	51

Table 12.24. Phase 6 platters

exterior finish				interior finish							thickness			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
74	207	50	13	96	40	19	20	50	4	4	5	64	200	8
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
15	7	13	7	260	24	9	1	88	131	82	36	3	46	1

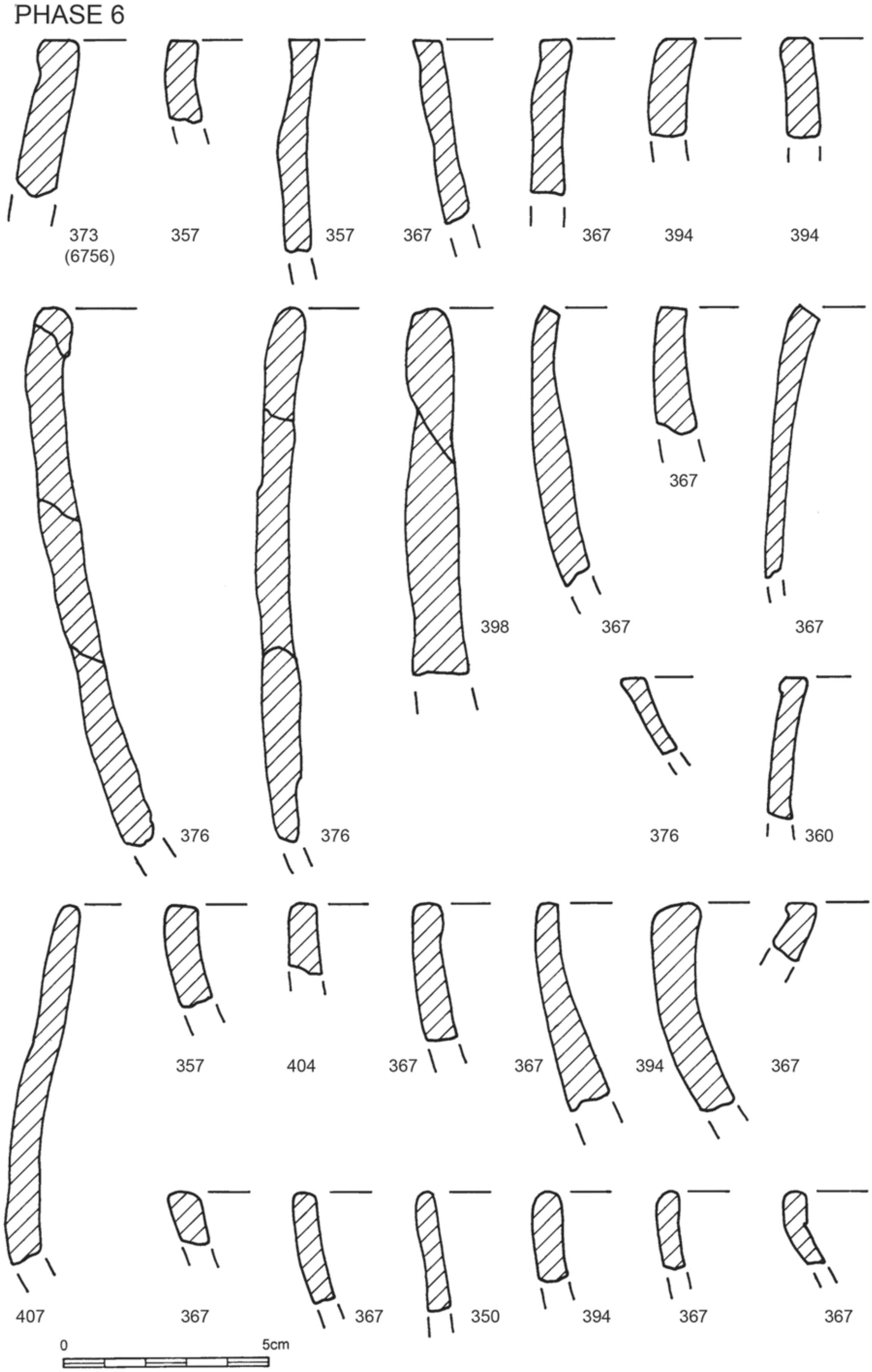


Figure 12.17. Phase 6 rim forms

Table 12.25. Phase 6 rims

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
35	13	6					2	2	2	4	26	21	4	17		16	
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
34	17	4		15	32	4		12	37	6	15	13	25	8	11	2	17
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
32	14	10	6			1	6	10	2		5	5	2	11	1	9	

Table 12.26. Phase 6 bases

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
37	31						1		1	3	12	41	8	3		1	

angle				interior colour				exterior colour				finish						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
6	7	18		29	27		1	7	54	7	2	5	9	8	3	12	19	13

type					diameter								deposits			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
20	45		4	1		3	1	4	5	2			22	41	41	23

majority of these are of A fabric, with 13 of B and six of C fabric. There are no examples of any other fabrics except, unusually, H and I. The most common sherd thickness is medium-walled (6mm–9mm) and thick, with the rest equally divided between thin and very thick. The identifiable forms are split equally between convex and open/flaring. The dominant interior colour is grey, with the remainder brown and just four orange/red. The exterior colour of most sherds is brown, followed by grey and very few orange/red sherds.

Half of the sherds are sooted with 12 blackened, six with carbonized residues and 15 with off-white residues. The most usual finishes are wiped and fingered, followed by smooth and organic impressions. Round rims are most common, followed by flat and shallow round rims. Expanded/lipped variants are also frequent. Vessel diameters for rim sherds fall within the range 100mm–140mm to 300mm–350mm, with high numbers lying at 220mm–260mm and at the top of the range (300mm–350mm).

Base sherds

There are 70 base sherds in phase 6 (Table 12.26). They are equally divided between A and B fabrics, with no other fabrics present except one sherd of H fabric. Sherds are much thicker than in any previous phase, with the majority being thick-walled, followed by medium and very thick; just three are thin-walled. Where vessel form could be worked out, three sherds are from convex vessels and one from an open/flaring vessel. Basal angle is most frequently steep, followed by equal numbers of medium and shallow. Phase 6 is the first time that shallow bases are present in any numbers.

The most frequent interior colours are equally grey and brown. The exterior colour is most frequently brown, followed by grey and orange/red with two pink/purple sherds. All surface finishes are present, most commonly fingered. Most bases are sagging, with the remainder being flat. Footed variants are present, along with a single rounded base. Over half of the bases are sooted and covered with carbonized residue; fewer of the bases are blackened and have off-white residue. The 15 basal diameters spread across the range from 100mm–140mm to 260mm–300mm, with most grouped between 180mm and 260mm.

Body sherds

There are 143 body sherds in phase 6 (Table 12.27). The majority of these are A fabric, with 36 of B fabric and just one each of E, F and I fabrics. Unlike any other phase, thick-walled sherds dominate the assemblage, with almost as many very thick sherds as medium thickness ones and just one thin sherd. This vessel thickness is a consistent feature of phase 6 bases and rims and marks the assemblage as significantly different from all other phases.

Where vessel form is identifiable, the vast majority of vessel sherds are of curved form, with one convex and just

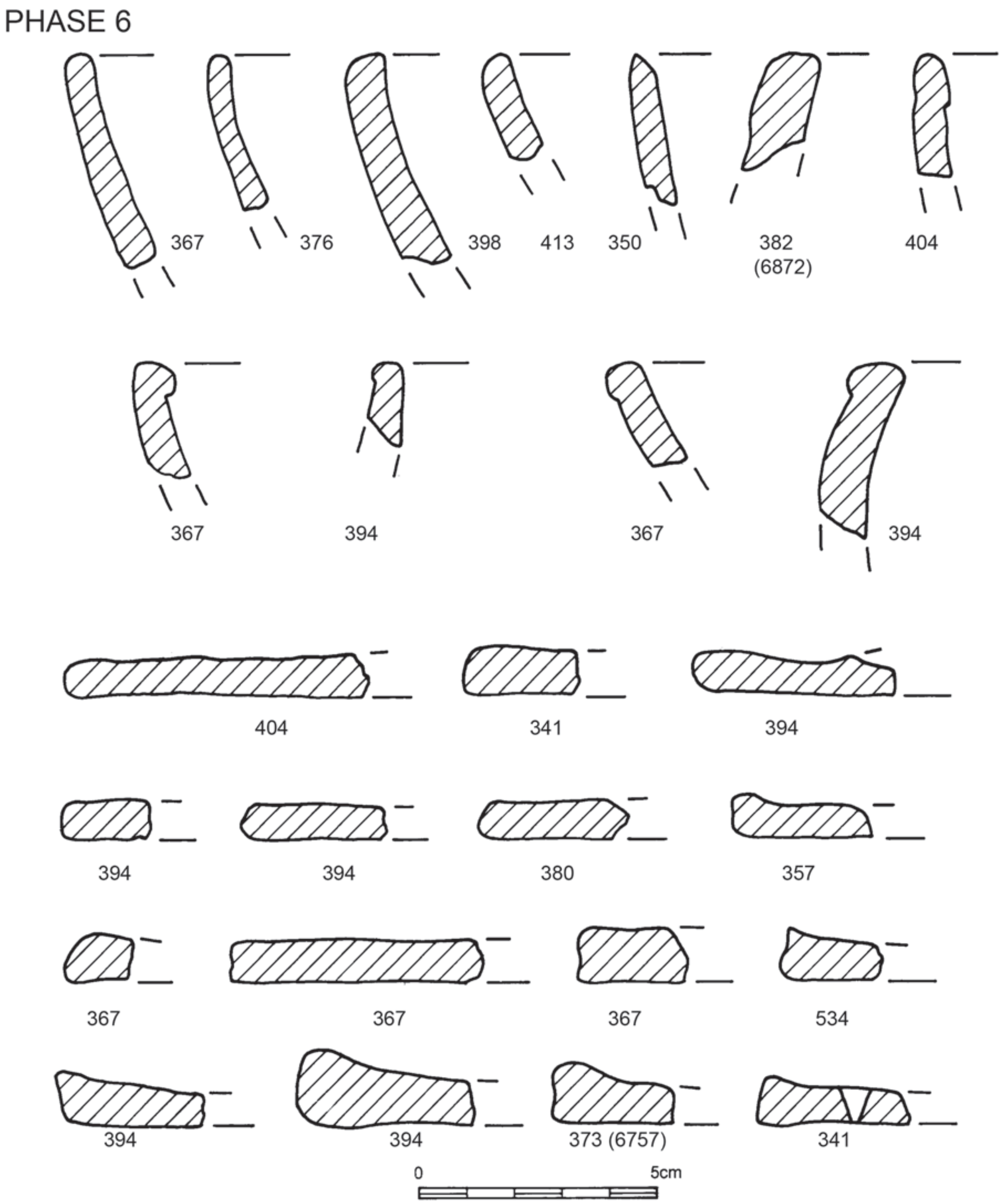


Figure 12.18. Phase 6 rim forms

Table 12.27. Phase 6 body sherds

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
103	36			1	1			1	1	1	33	68	28	1	61	7	
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
65	42	8		16	83	13	2	38	80	13	23	12	43	21	13	1	31

Table 12.28. Phase 7 platters

exterior finish				**interior finish**							**thickness**			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
146	733	105	19	144	51	196	69	76	30	25	19	440	508	
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
3	16	21	4	815	45	108	3	91	171	378	314	216	330	2

Table 12.29. Phase 7 rims

fabric										**thickness**				**vessel form**			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
48	1	9	9	19					3	45	36	5		3	23	21	28
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
40	27	13		24	37	16		50	64	25	14	57	21	7	6	4	4
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
20	22	31	15	3		4		4	2		4	4	17	4	2	10	

seven of open/flaring shape. Interior colours are mostly grey and then brown, with eight orange/red. The commonest exterior colour is brown, followed by grey, orange/red and two pink/purple. Most vessel finishes are wiped, followed by fingered and rough. There is only one grass-marked sherd. Just over half of the body sherds have soot residues, a very low proportion compared to other phases. Just 38 sherds are blackened, 13 have carbonized residues and 28 have off-white residues.

Phase 7

The pottery from Phase 7 is illustrated in Figures 12.19–12.22.

Platter

There are 1,003 platter sherds in phase 7 (Table 12.28). Most of the sherds are heavily grass-marked; the remainder are mostly split between light grass-marking and no grass-marking. On the interior, most sherds are channelled and many are fingered. Half the sherds are thick, with all but 19 of the remainder being of medium thickness. Bevelled-in rims are the most common, with most of the rest flat, though all rim types are present. Grey is the dominant interior colour, followed by orange; orange and then red are the main colours of the exterior. About a third of the sherds are sooted and carbonized, with a good proportion blackened too. There are 11 reconstructable diameters, with two small platters (100mm–180mm) and the rest of large size (260mm–350mm).

Rims

There are 101 rim sherds in phase 7 (Table 12.29). The majority of these are of A fabric, with 19 of E fabric, and a few examples of fabrics C, D and B only. The most common sherd thickness is, for the first time, thin-walled (up to 6mm), with the rest medium-walled and just five thick sherds. The small numbers of identifiable vessel forms are split between curved and open/flaring, with just three convex. The dominant interior colours are grey and brown, with the remainder orange/red. The exterior colour of most sherds is brown, followed by grey and orange/red.

More than half of the sherds are sooted, with half of them blackened, 25 with carbonized residues and 14 with off-white residues. The most common finish is smooth, followed by wiped. Shallow round rims are the most common, followed equally by flat and round rims. The 41 vessel diameters from rim sherds occur within the full range except for the very smallest and very largest size categories.

Base sherds

There are 136 base sherds in phase 7 (Table 12.30). The majority are of A fabric, with the rest being of C, D and E fabrics and only one of B fabric. Sherd thickness is like phase 5, with equal quantities of thick and medium, along with 16 thin sherds. Where vessel form could be worked out, two sherds are from curved vessels. Basal angle is most frequently steep, followed by medium and then shallow angles. The most frequent interior colours are grey, then brown and orange/red. The exterior colour is most often brown, followed by orange/red and grey. Finishes to the surface are commonly organic impressions and smooth, with all other treatments present.

Table 12.30. Phase 7 bases

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
82	1	14	10	18					11	16	38	39			2		116

angle				interior colour				exterior colour				finish						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
6	10	36	73	46	29	12		14	74	20		27	14	17	35	13	10	1

type					diameter								deposits			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
42	63		25	4		4	2	8	12	1	8		41	97	63	34

Table 12.31. Phase 7 body sherds

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
137	6	21	25	45	3	1	1		24	17	168	77	4	105	18	30	86

interior colour				exterior colour				deposits				finish					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
89	78	36	3	39	100	46		160	184	94	35	70	66	21	19	16	26

Nearly half of the bases are sagging, and a large proportion of flat bases are also present. Footed variants are common, and there are four sherds with rounded basal angles. Most of the bases are sooted but not to the extent of those in phases 4 and 5. Carbonized residues and blackening are also present, more often than in phase 6 but less often than in phases 4 and 5. There is a noticeably high number (n=34) of sherds with off-white residue. The 35 basal diameters spread across almost the whole range from 100mm–140mm to 300mm–350mm, with most grouped between 180mm and 260mm and at the top end of the range (300mm–350mm).

Body sherds

There are 266 body sherds in phase 7 (Table 12.31). The majority of these are of A fabric, with 45 of E, 25 of D and 21 of C fabric. All other fabrics are present except for I. Sherds of medium thickness are most common, with 77 thick and four very thick sherds, and 17 thin sherds. The vast majority of identifiable vessel forms are convex, with 18 curved and 30 of open/flaring shape. Interior colours are mostly grey and brown, with 36 orange/red and three pink/purple. The commonest exterior colour is brown, followed by orange/red and then grey. Most vessel finishes are smooth and wiped, with the remainder of treatments fairly equally represented. Two-thirds of the body sherds have soot residues and blackening is almost as common. Carbonized residues are found on a third of sherds but off-white residues are rarer.

Phase 8

The pottery from phase 8 is illustrated in Figure 12.23.

Platter

There are 343 platter sherds in phase 8 (Table 12.32). These divide into near-equal groups numerically, either with no grass-marking at all or with heavy grass-marking. On the interior, channelling is dominant but all other finishes except for seed impressions are represented. The sherd thicknesses are divided almost equally between thick and medium, with just one thin sherd. Flat rims are now the most common, followed by bevelled-in rims, though examples of the other two rim types are present. Grey is the most dominant interior colour, with small numbers of brown and orange sherds. Orange is the dominant exterior colour, with small numbers of brown and grey sherds. A third of the sherds are sooted and a smaller proportion are blackened. There are 13 reconstructable diameters, with two small platters (100mm–140mm and 180mm–220mm) and the rest, like those of phase 7, of large size (260mm–350mm).

Rims

There are 24 rim sherds in phase 8 (Table 12.33). The majority of these are of A fabric, with four of C fabric and otherwise single examples of E and H fabrics only. The most common sherd thickness is medium-walled, with the rest thin- and thick-walled. The small proportion of identifiable vessel forms includes convex, curved/convex and open/flaring. The interior colours are equally grey and

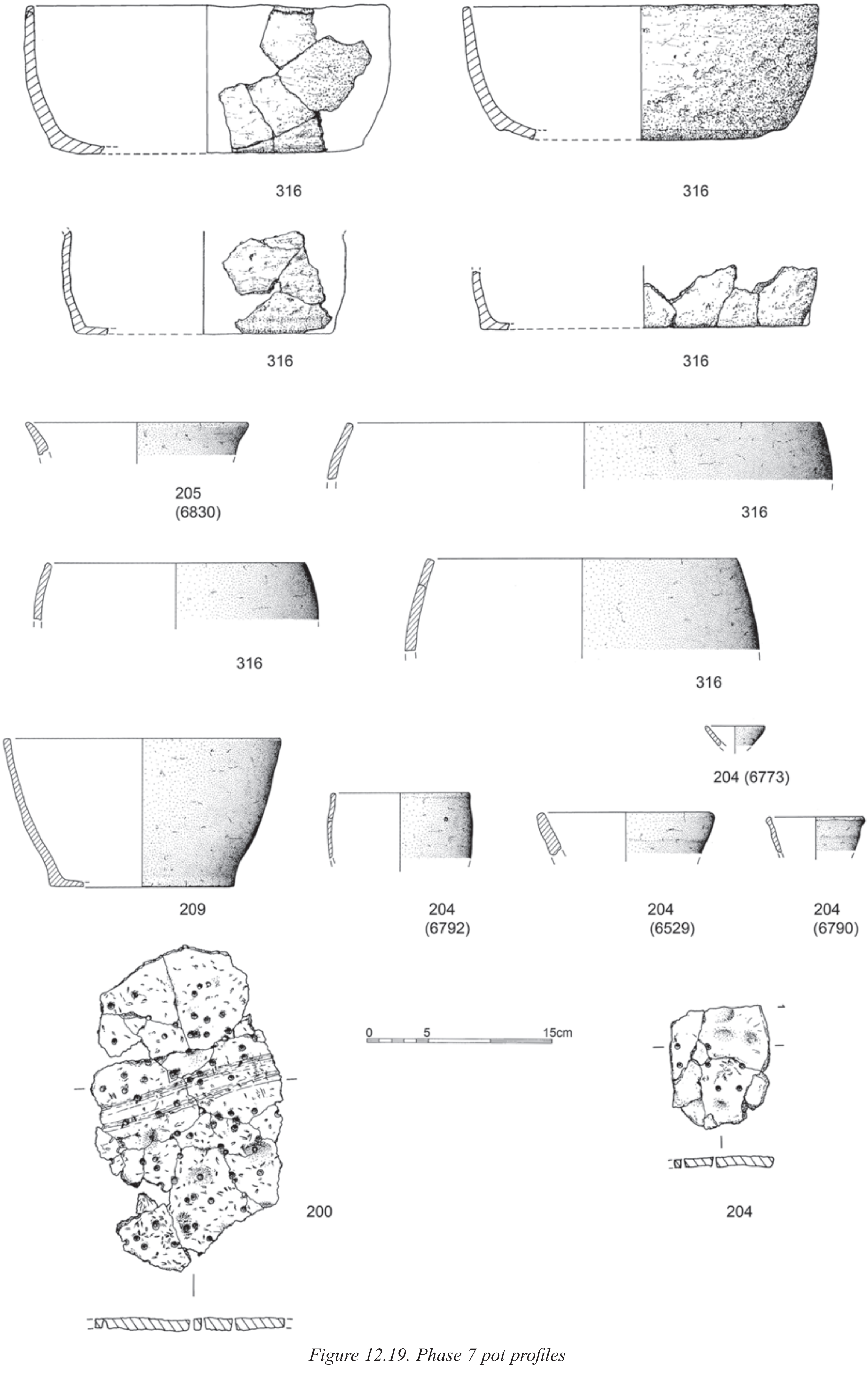


Figure 12.19. Phase 7 pot profiles

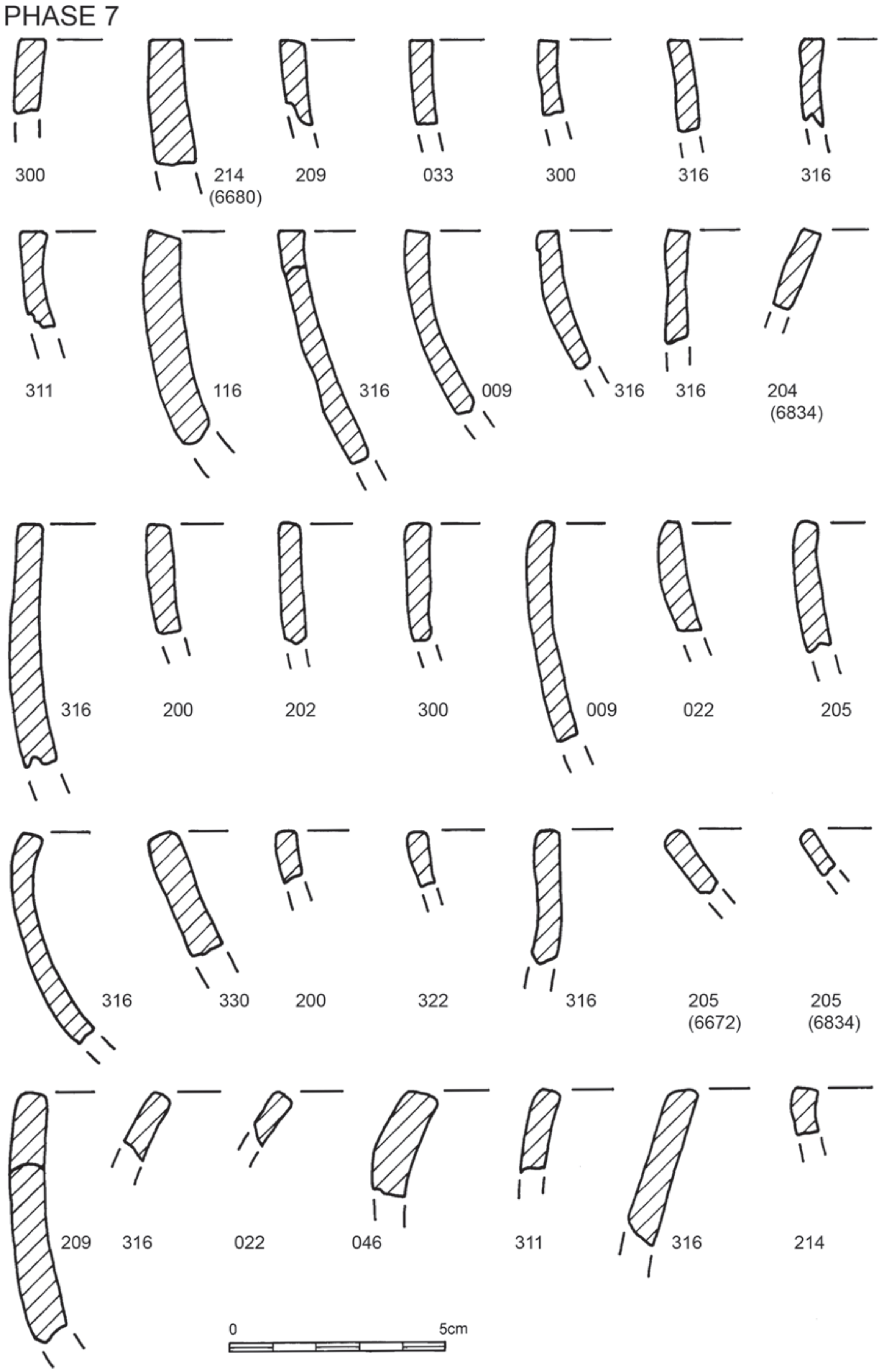


Figure 12.20. Phase 7 rim forms

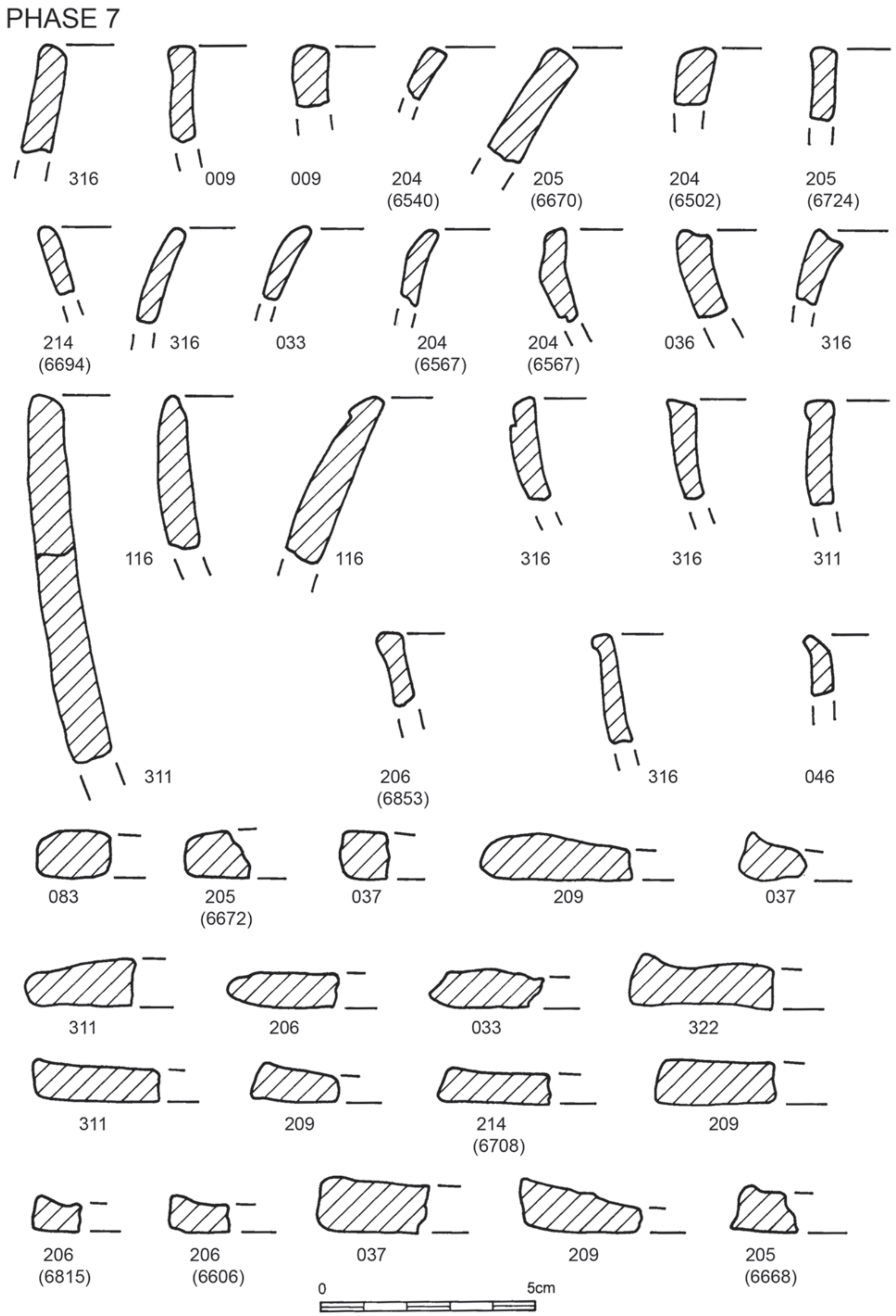


Figure 12.21. Phase 7 rim forms

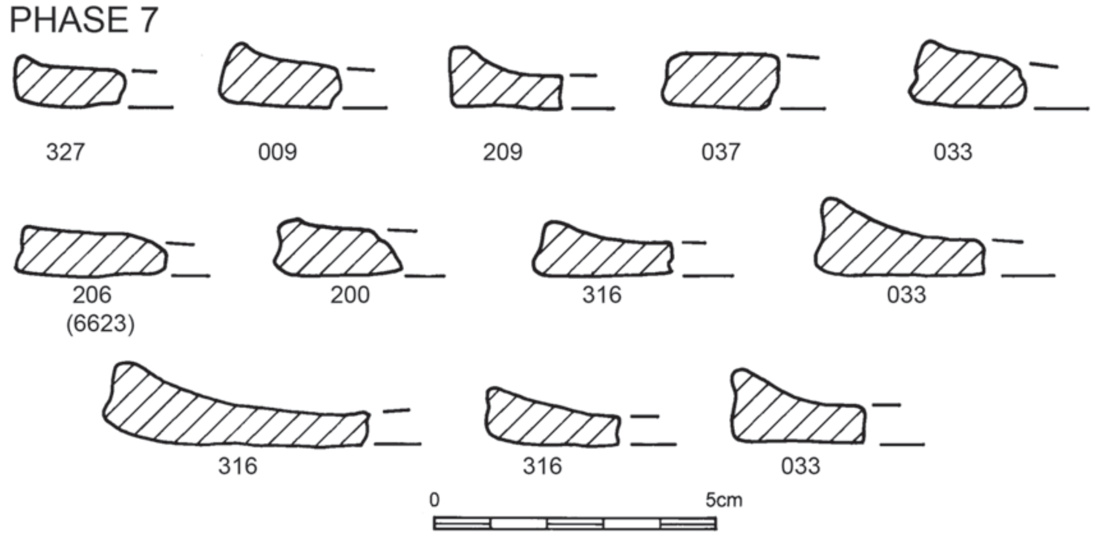


Figure 12.22. Phase 7 rim forms

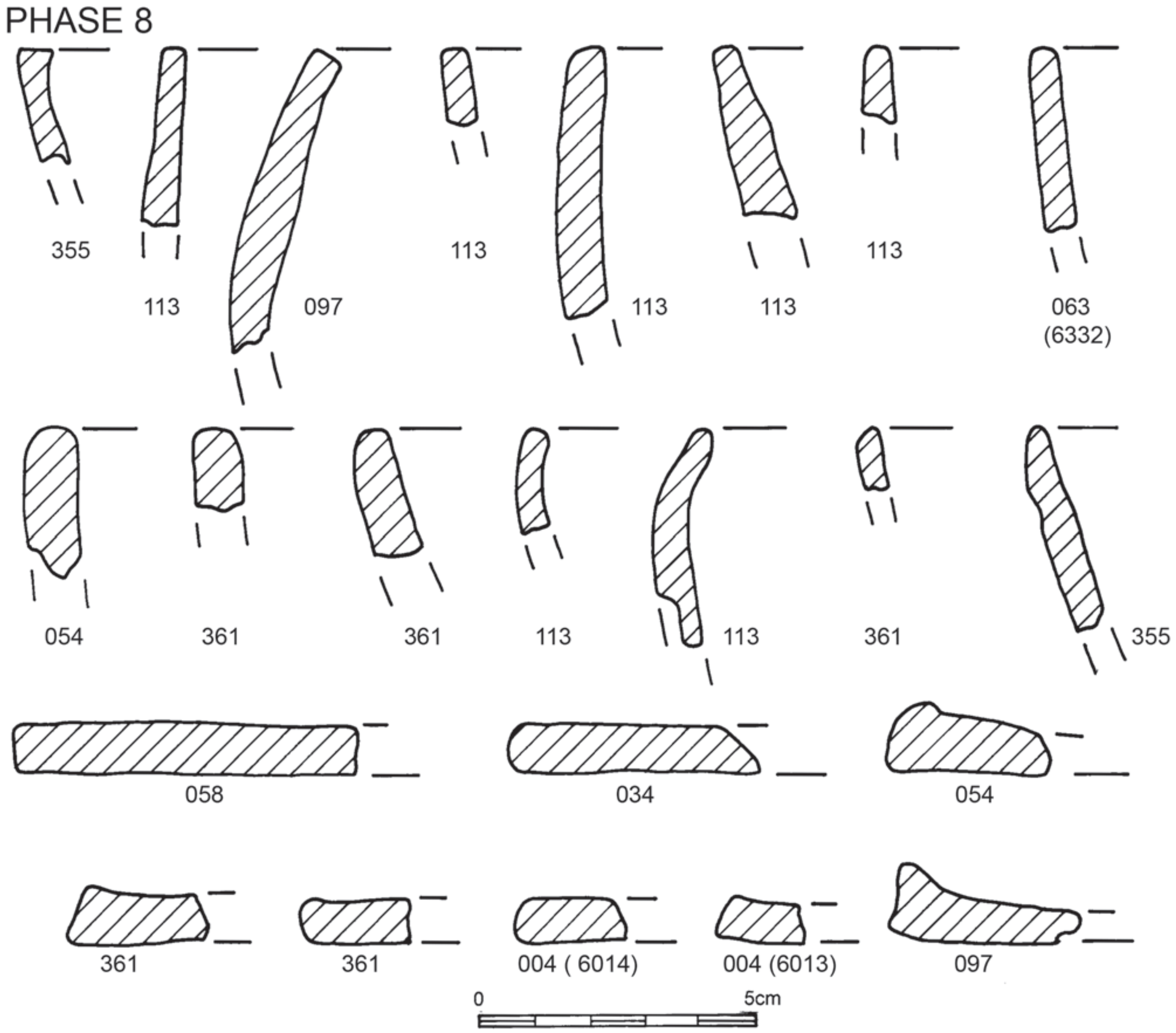


Figure 12.23. Phase 8 rim forms

Table 12.32. Phase 8 platters

exterior finish				interior finish							thickness			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
33	147	155	8	28	12	53	31	18	4		1	105	110	
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
2	8	5	2	190	20	9		3	48	142		58	115	2

Table 12.33. Phase 8 rims

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
10		4		1			1		1	5	14	3		2	1	3	18
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
5	4			3	5			9	11	5	1	4	4	1	7		
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
5	1	1	9		1				5			8	1	1	1		

Table 12.34. Phase 8 bases

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
31	3	7	1								16	22					64

angle				interior colour				exterior colour				finish						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	2	11	49	5	7			1	45	3		10	1	3	1	2	15	

type					diameter								deposits			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
11	24		8	1		1	7	2	5		1		37	56	28	10

brown. The exterior colour is brown and grey. Half of the sherds are sooted and/or blackened, five have carbonized residues and one has off-white residues. The most common finish is organic-impressed, followed by smooth and wiped. Flat rims with round corners, followed by round rims, are the most common rim forms. The majority of the 11 vessel diameters from rim sherds are 140mm–180mm.

Base sherds

There are 64 base sherds in phase 8 (Table 12.34). The majority are of A fabric, with the rest of B, C and D fabrics. Sherd thickness is divided between thick and medium. There are no vessel form data but the basal angle is most frequently steep, with two medium examples. The only interior colours are brown and grey. The exterior colour is most frequently brown, followed by a few orange/red and grey sherds.

Finishes to the surface are commonly fingered or smooth, with all other treatments present except for cracking. Just over a third of bases are sagging, with 11 being flat. Footed variants are common and one base sherd has a rounded basal angle. Virtually all of the bases are sooted whilst carbonized residue and blackening are more frequent than in phase 7. The 16 basal diameters are most numerous in the 140mm–180mm size category.

Body sherds

There are 113 body sherds in phase 8 (Table 12.35). The majority of these are A fabric, with small numbers from B, C, D and E fabrics. Sherds of medium thickness are most common, closely followed by thick sherds. There are no thin sherds. Only convex vessel forms are represented; open/flaring pots have virtually disappeared by this phase. Interior colours are mostly brown and then grey, with five

Table 12.35. Phase 8 body sherds

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
78	3	3	5	3					2		50	35		66			47
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
27	46	5		1	54	13	1	77	33	30	4	12	23	6	24		26

Table 12.36. Phase 9 platters

exterior finish				interior finish							thickness			
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*1*	*2*	*3*	*4*
13	1	5	1	4	2	6	1	1	1		2	12	11	1
rim type				**interior colour**				**exterior colour**				**deposits**		
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*
				19	3			3	7	9	3	2	9	1

Table 12.37. Phase 9 rims

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
5	3								1	2	5				2	1	1
interior colour				**exterior colour**				**deposits**				**finish**					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
5	1			5	1			4	2	1		3	1				
rim type										**diameter**							
1	*2*	*3*	*4*	*a*	*b*	*c*	*d*	*e*	*?*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
		3	3		1		3					4		1			

orange/red sherds only. The commonest exterior colour is brown, followed by orange/red, with single sherds of grey and pink/purple. Most vessel finishes are fingered, organic-impressed and wiped. Grass-marking is not present. Most of the body sherds are blackened but less than a third have sooting or carbonized residues, and only four sherds have off-white residues.

Phase 9

The pottery from phase 9 is illustrated in Figure 12.24.

Platter

There are 26 platter sherds in phase 9 (Table 12.36). Half of them have light grass-marking on the exterior. The most frequent interior finish is channelling. Most of the sherds are divided equally between medium and thick, but thin and very thick sherds are also present. There are no rims. Grey is the most dominant interior colour, and orange and then brown are the main colours of the exterior. Only a third of the sherds are sooted. There are no reconstructable diameters.

Rims

There are nine rim sherds in phase 9 (Table 12.37). The majority of these are of A fabric, with B and I fabrics also present. The most common sherd thickness is medium-walled, with the rest thin-walled. The two identifiable vessel forms are curved and open/flaring. The dominant interior and exterior colour is grey. Only two sherds are sooted and four are blackened, with one having carbonized residues. The only finishes are rough and grass-marked. Rims are either shallow round or flat with rounded corners, with three rolled and one everted example. Four of the five vessel diameters are 140mm–180mm.

Base sherds

There are 22 base sherds in phase 9 (Table 12.38). More than half are of C and A fabrics, with one of B fabric. Sherd thickness is mostly medium, with the rest thin and thick. Vessel form is convex and curved and base angles are medium, with one steep example. The main interior colour is grey, with three brown. The exterior colours are brown and grey, with one orange/red. Finishes to the surface are

Table 12.38. Phase 9 bases

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
6	1	7							7	5	13	2		2	1		1

angle				interior colour				exterior colour				finish						
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	4	1		19	3			9	13			12	2	1	2	1	1	

type					diameter								deposits			
1	*2*	*3*	*a*	*b*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*
3	12			8			1	1	1				9	8	5	1

Table 12.39. Phase 9 body sherds

fabric										thickness				vessel form			
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*?*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*?*
8		2							7	3	3	3	1		4		

interior colour				exterior colour				deposits				finish					
1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*	*6*
6	4			4	5	1		6	2	4	1	6	1				

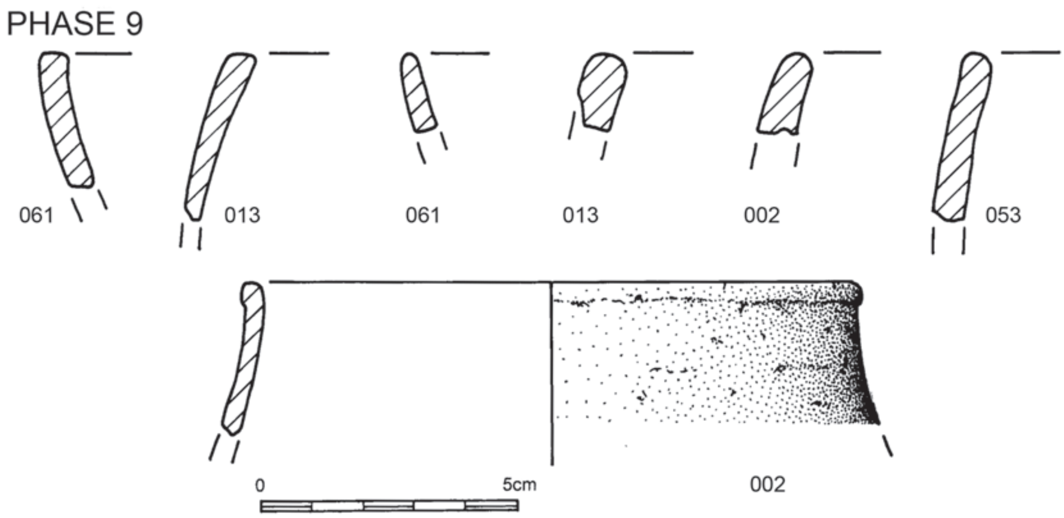


Figure 12.24. Phase 9 pot profile and rim forms

mostly smooth, with all other treatments present except for cracking. More than half of bases are sagging, with a few being flat. For the first time in the whole sequence, rounded basal angles are a common element. Sooting and other deposits are rare in this phase. The three basal diameters occur in the middle ranges (140mm–260mm) of the size categories.

Body sherds

There are 17 body sherds in phase 9 (Table 12.39). These are of A and C fabrics. Sherd thickness is spread across the entire range. The sherds derive from curved vessels. Interior colours are grey and brown. Exterior colours are brown and grey, with one orange/red sherd. Vessel finishes are smooth, with one wiped. Half of the body sherds have soot residues and blackening, and carbonized and off-white residues are present.

12.2 The imported pottery

E.J. Pieksma

Introduction

The excavations produced a small group of visually

distinctive pottery sherds from a number of contexts belonging primarily to phase 4 with just three sherds from phases 5–7 (Table 12.40). The sherds (43 sherds weighing 293g) are very different in character, notably in surface treatment, decoration and fabric, from those usually encountered in Hebridean assemblages.

Aims

The aims of the analysis were to:

- Establish if all the sherds are the same fabric type.
- Establish how many vessels are present and their forms.
- Establish a date for the sherds.
- Establish a provenance for the sherds.

Methodology

The pottery was processed by context. Information about vessel form, form element, sherd number, rim percentage, sherd weight and fabric type was recorded for all sherds on a Pottery Quantification Record. Other attributes such as sherd condition, the presence of residues and evidence of sherd re-use were also recorded. Fabric characterization of the sherds was carried out using a binocular microscope with a ×10 magnification and the details recorded on a Fabric Reference Record.

The analysis of the pottery assemblage follows the guidelines described by Blake and Davey (1983) and Orton *et al.* (1993). The fabric analysis and characterization follows the method described by Peacock (1977) and description of the pottery forms follows the classification published by the Medieval Pottery Research Group (1998).

Fabric

Analysis of a range of characteristics such as fabric type, texture, colour and hardness showed the sherds to be a homogeneous group. All the sherds are moderately hard, coarse-textured and have a smooth, soapy feel. The sherds have a white (10YR 8/1) external margin with a dark grey (7.5R 4/0) reduced core. Their internal surface is light reddish-brown (5YR 6/3) and is very heavily vesiculated where the surface is unprotected by the glaze.

The most dominant inclusions are abundant, ill-sorted, sub-rounded grains of white and grey limestone 0.16mm–1.50 mm in size. Where the surface is unprotected, these limestone inclusions have weathered out to leave a heavily vesiculated surface. Less abundant are grey and white, rounded, well-sorted grains of Oolitic limestone, 0.33mm–0.50mm in size. Also present are sparse, rounded grains of clear quartz (0.16mm–0.50mm) and sub-rounded grains of red iron ranging from 0.33mm–1.33mm in size.

Table 12.40. Number and weight of imported sherds by context

Context	Number of sherds	Sherd weight (g)
009 (phase 7)	1	13
313 (phase 5)	1	1
356 (phase 4)	12	106
357 (phase 6)	1	16
387 (phase 4)	8	35
504 (phase 4)	4	14
531 (phase 4)	1	1
544 (phase 4)	14	105
U/S	1	2
Total	**43**	**293**

Number of vessels present

As the sherds are so similar to each other, it was felt that looking for sherd joins, both within and between contexts, would aid in establishing how many vessels are represented in the assemblage. It was possible to reconstruct four large but still fragmentary areas of one or more vessels: one group of fragments belonging to a rim, two groups of fragments belonging to a vessel's body, and one group of fragments from a base (Table 12.41). The rim fragment group represents about 15% of a vessel with a diameter of *c.* 120mm; the base fragment group represents about 23% of a vessel with a base diameter of 160mm. None of these larger fragment groups join each other and it is not possible to reconstruct a vessel profile. The scarcity of diagnostic sherds (particularly handles, spouts or feet) means that it is not possible to establish how many vessels are represented in the assemblage. It is possible that the sherds are all from one vessel but it is equally possible that several vessels of similar form are present.

Decoration and form

The most noticeable characteristic of many of the sherds is the elaborate decoration on their outer surface. The layout of the decoration is best seen on the larger reconstructed body fragment, from context 544 (Figure 12.25). This fragment shows a sequence of alternating, parallel, combed bands and applied pellets (made from the same clay as the vessel) running around the body of the vessel. The upper combing (with three incised lines) is a continuous wavy line. Below this is a row of evenly spaced applied pellets. Next in the sequence is a criss-cross pattern with a combination of three or four combed lines. This decoration has been applied in two movements: the diagonal combing has been applied in one direction first and has then been overlaid by combing in the opposite direction. Below this is another row of evenly spaced applied pellets. The curvature on this fragment indicates that it is from a vessel with a rounded or globular form.

A tantalizingly small amount of incised or combed decoration is seen on the reconstructed rim fragment (Figure 12.25). The rim is upright and flat-topped and there is a deliberate thickening or cordon around the neck. Below this, just on the edges of the sherd fracture, are two incised curves

Table 12.41. Number of sherds by context that are part of the reconstructed imported Minety-type ware vessel

	NE Midden (009)	Sheds 400 & 406 (357)	House 500 (356)	House 500 (387)	House 500 (531)	House 500 (544)	Total
Rim	1	1					**2**
Body						12	**12**
Body			1	1	1		**3**
Base			8	4			**12**
Total	**1**	**1**	**9**	**5**	**1**	**12**	**29**

or combed lines. Though the decoration is fragmentary, it is likely that the two curves represent the top of a combed wavy line running around the neck of the vessel.

The reconstructed fragment of base (Figure 12.25) is sagging or convex in form and is undecorated. A slight thickening on the underside of the base is evidence for the attachment of a foot.

The rim form and the overall appearance of the reconstructed body and base fragments indicate that the sherds are from a fairly large, rounded jug or pitcher. The evidence for a foot on the base fragment shows that this fragment at least is part of a tripod pitcher.

Manufacture

Many of the sherds display attributes associated with handmade vessels. Dimpling of the surface and uneven thickness of the vessel wall – features commonly found on vessels formed by hand – are especially noticeable on the larger reconstructed fragment of body. The reconstructed fragments of base and rim, however, show evidence of having been finished using a wheel. Also of interest on these two fragments is the presence of a thin, clear glaze on the inner surface. The glaze on the rim sherd is thin but evenly spread, whereas the glaze on the base sherd is more partial and is smeared roughly in horizontal bands.

Provenance

One of the aims of the analysis was to establish a provenance for the assemblage. The overall characteristics of the sherds indicate that they are not locally made products. The fabric type, surface treatment and forms of the few diagnostic sherds suggest that they are products from the medieval kilns located near Minety in north Wiltshire. Minety ware pottery was first recognized by Musty (1973). Kiln wasters from the site form part of the British and European Medieval Pottery Reference Collection held at the Department of Medieval and Later Antiquities at the British Museum. Sherds from the Cille Pheadair assemblage were compared to the Minety ware sherds in this collection. Though the Reference Collection sherds are later in date (fourteenth–fifteenth century), the fabrics are very closely related. The size, range, and composition of the inclusions in the Cille Pheadair sherds are virtually identical to two bowl fragments in the reference collection, 'Minety 1970 1974, 9–8 1' and 'Minety 1971 1974, 9–8 2'. Since the research carried out by Musty (1973), it is now known that pottery manufacture at Minety was part of a much bigger potting industry operating in the Braydon Forest area; it is therefore probably more correct to refer to this ware as Minety-type ware (Vince 1984).

Date

Minety-type ware products appear to have been made over a long period, from the twelfth to the early sixteenth century (Vince 1984). The distribution of these wares is known to have been widespread. Minety-type ware pitchers have been recovered from excavations in Bristol (Ponsford 1991), Cirencester (Ireland 1998), Gloucester (Vince 1983; 1984), Dublin and other sites in Ireland (Hurst 1988). Minety-type ware tripod pitchers with similar characteristics to the sherds from Cille Pheadair have been recovered from excavations at Cirencester Abbey. Here large, handmade tripod pitchers with all-over glaze externally, a partial internal glaze and elaborate decoration have dated to the early to mid-twelfth century (Ireland 1998). A combination of horizontal bands of straight and wavy combing on the shoulder and diagonal combed lines on the girth appears to be a common form of decoration on these vessels (Vince 1988).

A pottery sequence based upon pottery fabrics and vessel forms has been established for Gloucester (Vince 1984). Included in this sequence is a suggested chronology for Minety-type wares based on vessel form (*ibid.*). This dating relies heavily on the forms of diagnostic sherds such as rims, spouts, handles and bases. Though the Cille Pheadair assemblage is completely lacking in spouts and handles, the upright rim form strongly suggests an early twelfth-century date for the Cille Pheadair sherds. The combination of combed decoration (wavy lines and criss-cross) with rows of applied pellets appears to be unusual. A body sherd with a similar combed criss-cross pattern was found at Ewan, Gloucestershire (Redknap 1990). This sherd is associated with other body sherds with the more typical Minety-type ware decorative combination of combed wavy lines with applied and thumbed strips. These sherds are dated to the late thirteenth century.

In conclusion, the sherds recovered from the Norse-period farmstead at Cille Pheadair are from one or more,

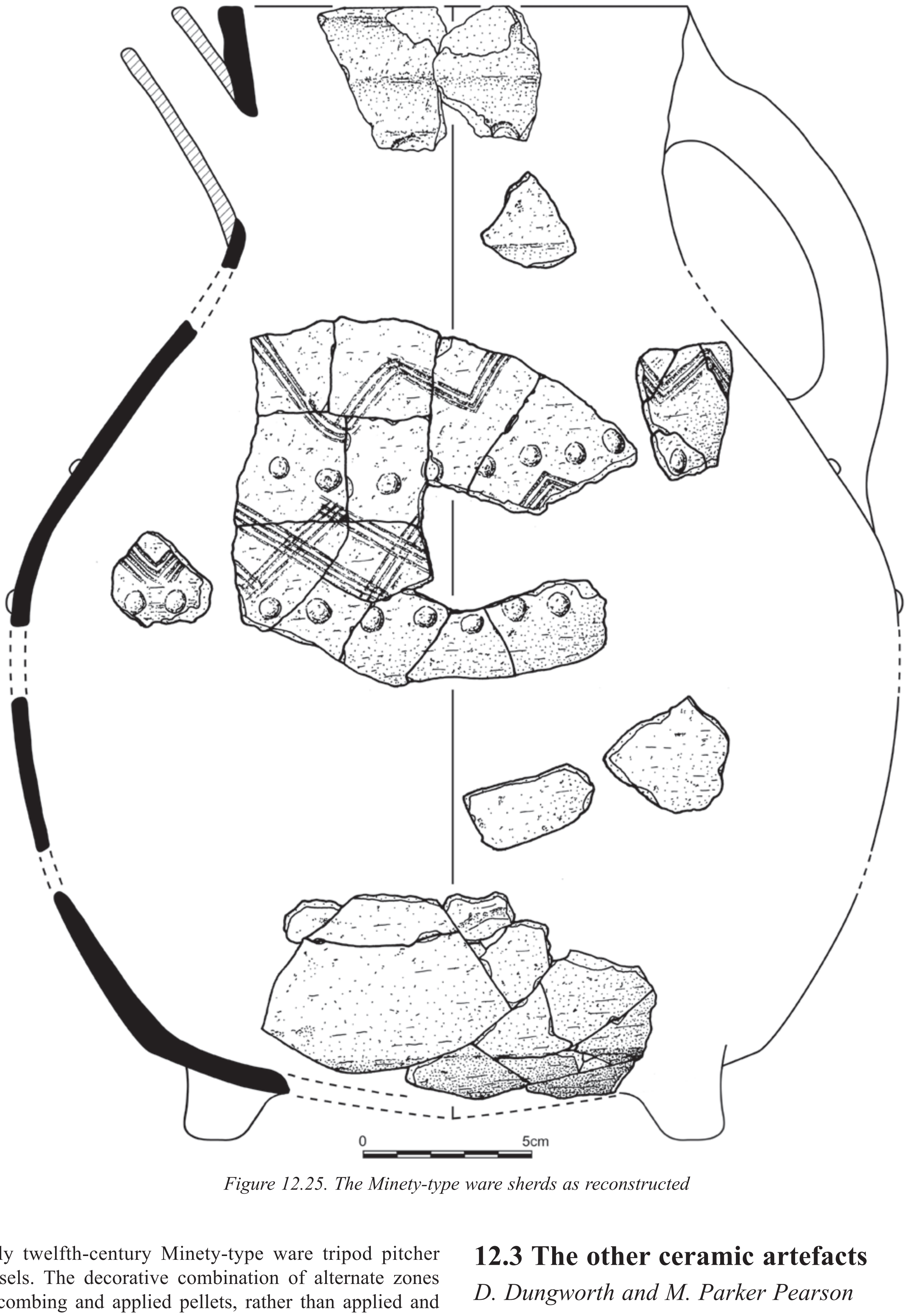


Figure 12.25. The Minety-type ware sherds as reconstructed

early twelfth-century Minety-type ware tripod pitcher vessels. The decorative combination of alternate zones of combing and applied pellets, rather than applied and thumbed strips, on tripod pitchers does not appear to have been previously recorded.

12.3 The other ceramic artefacts

D. Dungworth and M. Parker Pearson

Ceramic lamp

A fragment of an oval ceramic lamp was found in context 453 (phase 2). The fragment measures 112mm × 65mm,

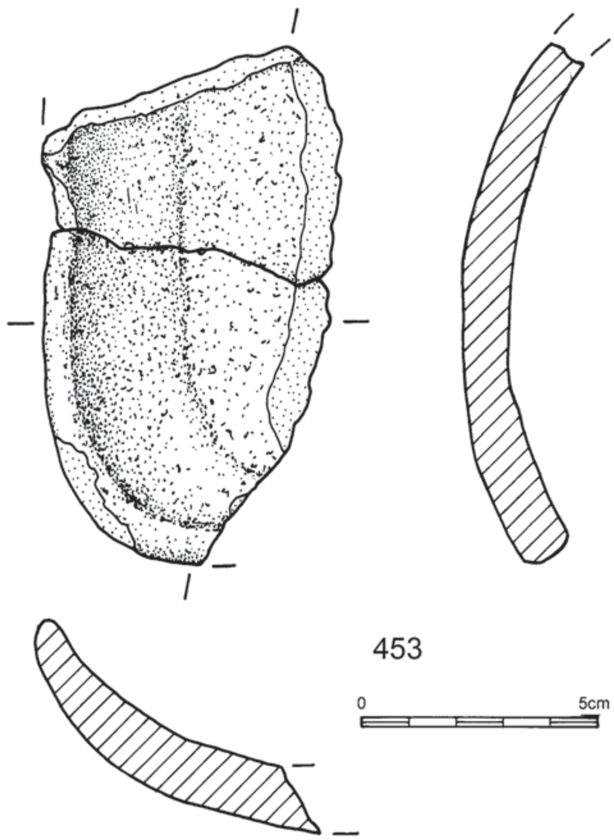


Figure 12.26. Ceramic lamp fragment from context 453

with a thickness of 13mm (Figure 12.26). The lamp would originally have been *c.* 150mm long by 80mm wide, with a depth of 30mm. It can be compared with examples in pottery and soapstone from the Biggings on Papa Stour in Shetland (Crawford and Ballin-Smith 1999: 139, 151–2).

Ceramic vessel

A fragment of a ceramic vessel found in context 548 (SF 2778, from environmental sample 7087) appeared to be part of a crucible and was submitted for examination. This appears to be a fragment of the rim (everted rim) of a very small vessel (Figure 12.27). The fabric is buff to dark grey and so was fired under at least moderately reducing conditions. There are no indications that the ceramic has been fired to a temperature high enough to

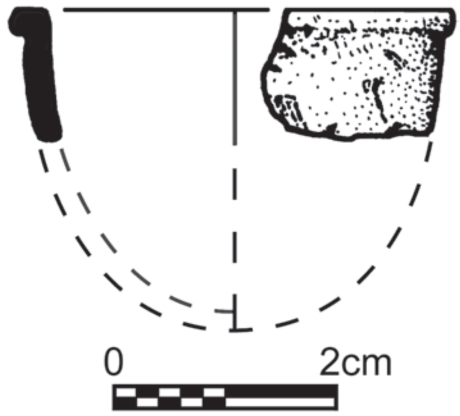


Figure 12.27. Small pot SF 2778 from context 548

vitrify it. The outer and inner surfaces were analysed qualitatively using energy dispersive X-ray fluorescence. This detected a range of elements that are typical for clays (*e.g.* silicon, iron, aluminium, potassium, magnesium, calcium, titanium, *etc.*) but could not detect any elements that would be associated with the casting of non-ferrous metals (*e.g.* copper, zinc, tin or lead). It is concluded, therefore, that this ceramic fragment is unlikely to have come from a crucible.

Non-vessel artefacts

There are just two pieces of ceramics which are not fragments of vessels.

2540 context 341. A small red-orange broken-off piece of a rectangular clay tablet (L 14mm, W 15mm, Th 6mm). The fabric is hard and grey with no obvious inclusions.

2622 context 382 (6870). A triangular surface fragment of baked clay (L 30mm, W 28mm, Th 3mm), sheared off a larger block. One side has broken off across a circular hole (D 5mm). The piece resembles platter ware but is insufficiently fired.

Note

1 Barabhas is referenced in the literature more commonly as Barvas. For interim and site reports, see bibliography in Cowie and MacLeod Rivett 2015.

13 The combs, ornaments, weights and coins

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13.1 Combs and comb cases

A substantial number of comb fragments was recovered from this settlement site, ranging from near-complete examples to individual teeth (Tables 13.1 and 13.2). These have been identified as being made from red deer antler, except for SF 1869 (phase 1) and SF 1127 (phase 3), which are probably made of reindeer antler, and SFs 1958, 2064, 2096 (all phase 4), SFs 1654 and 1661 (phase 5) and SF 2484 (phase 7), which are probably made of bone (Stephen Ashby pers. comm.). The majority of identifiable fragments conform to Irish type F combs, as categorized by Dunlevy (1988).

For chronological dating of combs and other artefacts within the Cille Pheadair sequence, see 'Comparison of radiocarbon dates with typological dating of artefacts' in Chapter 24.

F1 or A3 combs

Class F1 combs are single-sided composite combs with arched backs and low plano-convex profiles to their side-plates. Within this class there are some interesting individual combs from Cille Pheadair that deserve closer attention. Technically, SF 1127 (context 319) and SF 1869 (context 605) could be classified as class F1 combs, with their deep, thin C-shaped cross-sections and bands of interlace (Figure 13.1). However, there are fewer than 20 examples of this comb type from Ireland, and some of these are probably imports given the close parallels on the Continent (Dunlevy 1988: 364, 394–5). In Scotland, examples of the type have been recovered from pagan Norse grave contexts of late ninth- to early tenth-century date.

The above two combs from Cille Pheadair have therefore been classified in this catalogue according to Ambrosiani's system developed for the combs from Birka, Sweden (1981), as this is more refined for the type, which was manufactured within Scandinavia. The significance of using a Scandinavian typology for these two comb fragments (group A3) should be emphasized, for it is highly likely that they were manufactured within Scandinavia. This suggestion is reinforced by their identification as possible reindeer antler (Stephen Ashby pers. comm.), as this material was unavailable within the British Isles. Likewise, the riveting pattern apparent on SF 1127 is of typically Scandinavian type, with rivets at the junction of every tooth-plate (*ibid*.).

A3 combs have a wide distribution within northern Europe, with evidence for manufacture of the type at Staraya Ladoga, Russia (Davidan 1962), though other production locations are also likely if itinerant comb-makers were responsible for their manufacture. Although the type was current at Birka from the second half of the ninth century until the mid-tenth century (*ibid*.: fig. 10), eleventh-century contexts are recorded for finds from Lund, Sweden (Blomqvist 1941: 134; Blomqvist and Mårtensson 1963: fig. 230) and from Ballinderry, Ireland (Dunlevy 1988: 364). The majority of Irish finds come from late ninth- to tenth-century contexts, agreeing with their Scandinavian parallels whence they are thought to have been imported (*ibid.*: 364, fig. 6.2).

Several examples of the A3 comb type have been recovered from settlement sites in Scotland, including Pool, Sanday (Smith 2007: 467, ill.8.8.4: PL5272, 0005), the Brough of Birsay (Curle 1982: ill. 36.225); Jarlshof (Hamilton 1956: pls XXII.a, XXX.1), Drimore (MacLaren 1974: fig. 2.38), Dunbar (Perry 2000: 147, ill. 103.380–1) and North Berwick (National Museums Scotland 1994: fig. 23). Examples of the type are also known from pagan burials in Scotland, including Ardvonrig, Barra (Bugge 1910: 77) and a possible burial from South Uist (Grieg 1940: 73–4, fig. 42).

The worn appearance of the Cille Pheadair fragment (SF 1127) suggests that it had an extended life, and it is interesting to note that a fragment of A3 comb from Mound 2 at the nearby site of Bornais also had an extended life, having been refashioned into a pendant (Sharples 2004: 263, fig. 5.15; forthcoming). Within Scandinavia, A3 combs are normally recovered from mid-ninth to tenth-century contexts (Ambrosiani 1981: 23–9). At Cille Pheadair SF

Table 13.1. Combs, pins and other ornaments by context and by phase

Phase 1

Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
323	1		1	
588		1		
590		1		1
602	1			
605	1			1
607	1	1		
608	1		1	
709				1
711		2		
715		1		
723	1			
760			1	
762		1		
Total	***6***	***7***	***3***	***3***

Phase 2

Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
572	1			
573	2			
580		1		
582	2	4		
600	1			2
618	2	1	1	
622	1			
Total	***9***	***6***	***1***	***2***

Phase 3

Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
137	2			
319	2	2		
320				1
328	1			
425		1		
454	1			
465	1			
528		1	1	
701	1	1		2
Total	***8***	***5***	***1***	***3***

Phase 4

Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
126	1			
133	2			
135		1		
317	1	1		1
358				1 (glass)
366	1			
370		1		
414	1			
422		2		
430		1	2	1
440		1		
442				1
460		1		
474	1			
475		1		
504	5	4	2	
544	2	1		
548	3	1		1
552	1			
554		2		
555		1	1	2
569	5	3		
570	1			
651		1		
Total	***24***	***22***	***5***	***7***

Phase 5

Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
010	6	5	1	3
023	1		1	
128				1
219		1		1
308	1	3		
313	2	2		
315	1	2	1	
351	5	3	1	
389	1			
420	1			

Table 13.1. Continued

503		1		
507	1	2		
512		1		
517				1
522		1		
533	1			
534		1	1	1
535		1		
547	1			
Total	***21***	***23***	***4***	***7***
Phase 6				
Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
341	1			
367	1			
374				
381		1		
398	1	1		
403		1		
Total	***3***	***3***		
Phase 7				
Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
009				1
020	3			
022	1			
033		1		
036	2			
060	1			
116	1	1		
200			1	
204		1	1	1
205		1		1
206		1		
209		1		
214		2		
300	1			
311	2			
322		2		
327		1		
329				1
375	1			
Total	***12***	***11***	***2***	***4***
Phase 8				
Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
004	1			1
034	1			
051				1
091	1			
108				1
Total	***3***			***3***
Phase 9				
Context	*Comb*	*Pin*	*Ornament/ dress fitting*	*Metal*
029			1	
030				1
044				1
070	1	1		
087	1			
Total	***2***	***1***	***1***	***2***

1869 was recovered from a phase 1 pit, and SF 1127 from a phase 3 midden. Both fragments are worn and likely to date from towards the end of the A3 spectrum, perhaps the late tenth or early eleventh centuries. This accords well with the eleventh-century radiocarbon dates for these phases.

B4 comb

The only other comb tentatively categorized within the Scandinavian system is SF 2132 (context 582 in phase 2), which belongs to Ambrosiani's B4 category. This comb is characterized by the relatively raised plano-convex cross-section of its side-plates and its largely undecorated, polished surface (Figure 13.2).

At Birka such combs were current throughout the tenth century, particularly its second half (Ambrosiani 1981: fig. 10), and elsewhere they continue into the eleventh century. Class B combs are less prevalent in Scotland than type A combs (*ibid*.: 22), but there are a couple of examples from Skaill, Deerness (Ashby 2016: 264), along with a comb complete with case from the Links of Skaill burial, Orkney (Grieg 1940: 81, fig. 45). Ambrosiani regards such insular finds of the type, including examples from York and Dublin, as imports from Scandinavia (1981: 31–40, fig. 11), though there should be some caution in assigning the Cille Pheadair example a Scandinavian origin on account of its riveting pattern, with rivets only at every alternate tooth-plate junction, rather than apportioned to each tooth-

plate, which raises the possibility that this comb may be of insular manufacture.

F2 and F3 combs

Dunlevy's F2 class likewise comprises single-sided composite forms with arched backs. Their side-plates are of rounded C-shaped cross-section and bear simple linear decoration on polished surfaces. F2 combs were popular within both Scandinavia and Ireland, with over 50 examples having been recorded from Ireland (Dunlevy 1988: 395–8). However, F2 combs are poorly represented at Cille Pheadair with only six certain examples. It seems probable that the F2 combs found at Cille Pheadair (in contexts ranging from phase 1 to phase 9) might have been manufactured in Ireland, where the type was prevalent with a concentration in Dublin, coming from contexts ranging from the late ninth to the early twelfth centuries (*ibid*.: 364–5).

The most popular comb type represented at Cille Pheadair is Dunlevy's class F3, classified according to a system developed for the Irish combs. The type is a single-edged composite comb with trapezoidal or bevelled side-plate cross-sections, creating two fields for decoration, with a medial ridge or, on occasion, a third field for ornament between. The decoration is typically composed of incised linear motifs, notably parallel lines. Although the origin of trapezoidal plates can be traced to eighth-century Frisia (MacGregor 1985: 90), the type flourished in the tenth and eleventh centuries (*ibid*.). More than 60 examples of the type are known from Ireland, with the greatest concentration having been recovered from Dublin, where they were probably mass-produced (Dunlevy 1988: 366–7, 398–402). The Dublin contexts range from the tenth to twelfth centuries.

The F3 type is well represented in Scandinavia (Dunlevy 1988: 367), but it is probable that the Cille Pheadair examples were either manufactured locally – there being evidence for comb production at nearby Bornais from the thirteenth century onwards (Parker Pearson *et al*. 2004: 151–2; Sharples forthcoming) – or were imported from Ireland. Several sites in Scotland, in Orkney, Shetland and South Uist, have produced F3 type combs (Ashby 2016: 266), and there are a few fragmentary examples from Whithorn, Galloway, where there is also evidence for production of type F3 combs (Nicholson in Hill 1997: 482–3; 479).

G combs

Cille Pheadair also produced several examples of Dunlevy's class G combs, the earliest example appearing in phase 4. These single-edged composite combs, with straight backs and long, narrow, D-shaped side-plates, are frequently highly polished, though often undecorated. Some of the Cille Pheadair examples have distinctive rope-like ornament. An example from Winetavern Street, Dublin gives an indication of the substantial length of some of these combs (Dunlevy 1988: fig. 9.2). Typically the teeth are short and fine, and teeth-cutting marks extending into the lower edge of the side-plate are so regular as to be deliberate. The type is known from various early medieval contexts in Scandinavia (MacGregor 1985: fig. 50 k.90–1; Dunlevy 1988: 368; Blomqvist 1968: 27, Abb. 4).

Type G combs were popular in Ireland, and Dublin in particular (Dunlevy 1988: 368, 402–5) where contexts range from the tenth to thirteenth centuries (*ibid*.: 368), and Waterford, where the majority of twelfth- and thirteenth-century combs belong to this class (Hurley in Hurley *et al.* 1998: 654). Within Scotland examples of type G combs were recovered from Jarlshof (Hamilton 1956: 148, 167–8, figs. xxx 3; xxxii 3–4).

Dating

Comb typologies can provide relatively good dating sequences on the grounds that these were personal items of limited durability. The date ranges for the various classes are large, however, with related forms and decorative motifs appearing over much of northwestern Europe, possibly in response to itinerant comb-makers and mass production within urban centres.

- At Cille Pheadair, the A3 comb fragments (SFs 1127 and 1869) are probably the earliest combs represented at the site and would indicate a Scandinavian association during this period. The former fragment is very worn, in accord with its deposition date after *cal AD 1030–1095*. It was recovered from a midden belonging to phase 3.
- The tentatively identified B4 comb, SF 2132, was recovered from a phase 2 fill layer; the phase is dated to *cal AD 945–1020*.
- A phase 1 pit contained a fragment of A3 comb (SF 1869) together with a fragmentary F3 comb (SFs 1854–1859). Although devoid of most of its teeth, SF 1854–1859 is freshly cut and incised and would appear to have been deposited shortly after its manufacture.

Comb cases

There are a few probable comb cases from Cille Pheadair. Two conjoining fragments (SFs 2109 and 2205) from layers 573 and 572 (phase 2) are probably from the same item as SF 2107 (also from 573) on account of their decoration and burnt condition (Figure 13.1). The combined length of SFs 2109 and 2205 suggests that, in the absence of rivets and teeth indentations, they do not belong to a comb. However, their sub-triangular profiles and ornament are typical for combs and so the plates almost certainly belong to a comb case, the form and ornament of the case frequently mirroring that of the comb itself. This would suggest that the comb belonging to this case was of Dunlevy's F3 class, dating from the tenth to twelfth centuries (1998: 364–5). Another possible comb case fragment (SF 1792) comes from context 366 (phase 4). A third is SF 1503 from context 351 in phase 5, crudely repaired with a lead backing (Figure 13.4).

Table 13.2. Combs, pins and other ornaments by context type and phase

Phase 1			
	Comb	*Pin*	*Ornament*
Pit	2	6	2
Fill	1		
Organic layer	1	1	
Sandbank	1		
Phase 2			
	Comb	*Pin*	*Ornament*
Fill	1		
Organic layer	1		
Midden	6	2	1
Sandbank			
Phase 3			
	Comb	*Pin*	*Ornament*
Exterior floor	1		
Fill			
Organic layer			
Midden	5	2	
Floor	1	1	
Sandbank			1
Phase 4			
	Comb	*Pin*	*Ornament*
Construction	8	5	
Fill	1	2	
Midden	4	7	1
Floor	11	6	2

Phase 5			
	Comb	*Pin*	*Ornament*
Construction			
Fill	10	4	2
Midden	6	8	1
Organic			
Floor		3	
Phase 6			
	Comb	*Pin*	*Ornament*
Construction			
Fill	1		
Midden	2	1	
Organic		1	
Floor			
Phase 7			
	Comb	*Pin*	*Ornament*
Construction		1	
Fill	3	1	
Midden	3	2	
Floor	1	6	
Phase 8			
	Comb	*Pin*	*Ornament*
Fill	1		
Floor	2		
Phase 9			
	Comb	*Pin*	*Ornament*
Construction	1		
Floor	1	1	

Comb cases became popular in the period of class F combs, when finds suggest that they were manufactured in Dublin (Dunlevy 1988: 373–4). The closest parallel to the combined fragments from Cille Pheadair phase 2, with its two rows of ring-and-dot, is a complete comb case from Winetavern Street, Dublin (*ibid.*: fig. 12), the decoration of which even includes the rather idiosyncratic double contour along only one of its central margins. Within Scotland there are parallels too, including Birsay (Curle 1982: ill. 49.231), the Udal (Selkirk 1996: 88) and Freswick (Curle 1939: pl. XLVII.1).

Catalogue

Phase 1

1815 context 323. Intact tooth-plate with square edges and traces of a rivet-hole and iron-staining on one side (L 20mm, W 32mm, Th 3mm). Ten intact, though worn, teeth with transverse indentations predominantly on one side. There are two small borings in the centre of the plate, possibly abandoned rivet-holes.

1854–1859 context 608. Fragmentary single-sided composite comb (L 95mm, W 26mm, Th 12mm). Most of one side-plate is missing, as are both ends of the surviving plate. Four corroded iron rivets are still in place, with traces of two further examples. There are the fragmentary remains of five tooth-plates, but only four actual teeth survive. The side-plates have straight lower edges and gently curving backs, with incised margins decorating each. A pair of incised horizontal lines marks the median, highlighting the sub-triangular cross-sections of the plates

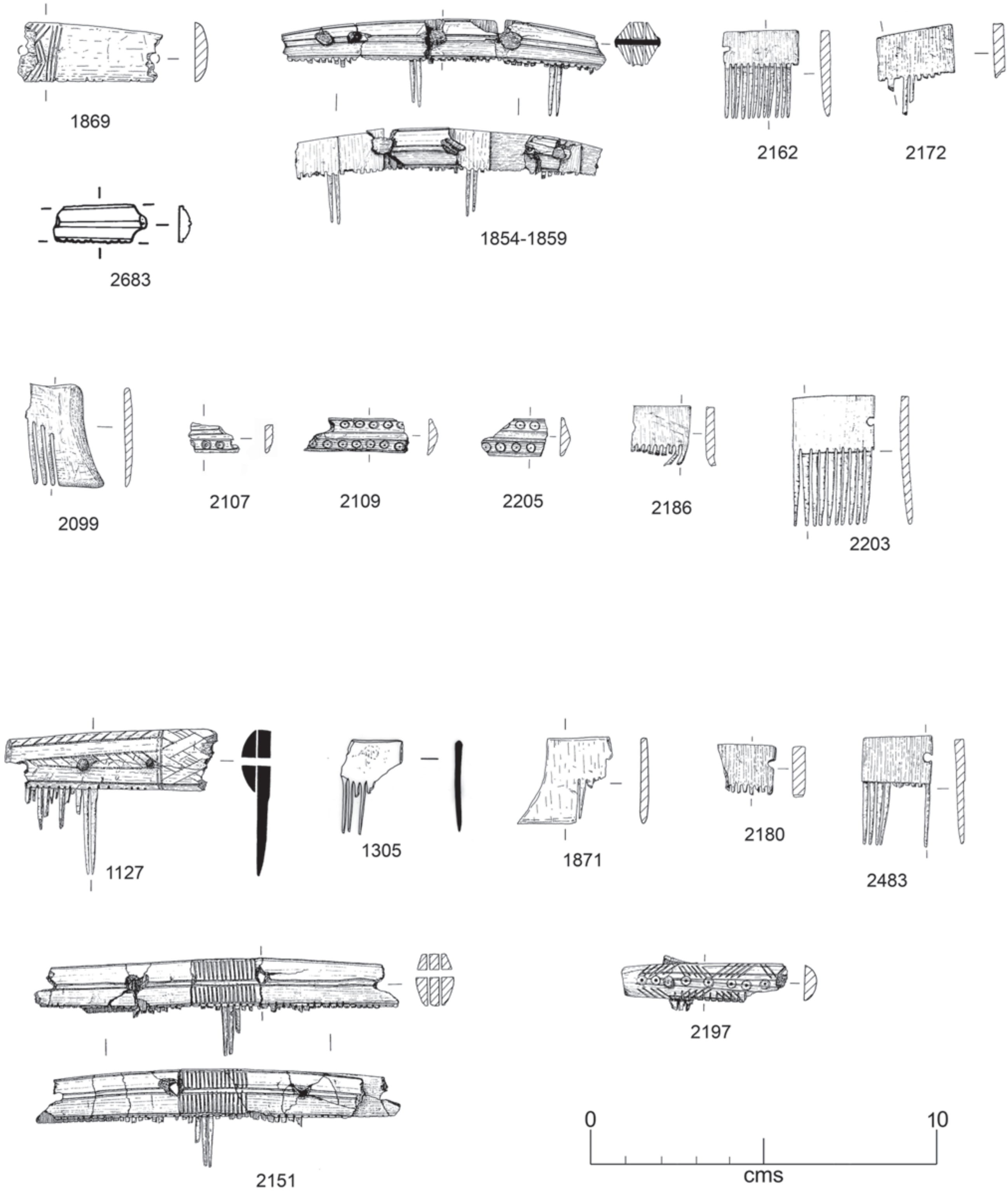

Figure 13.1. Comb fragments from phases 1, 2 and 3

(Figure 13.1). Although this comb is largely undecorated, its sub-triangular profile and field divisions identify it with Dunlevy's F3 (1988: 366–7).

1869 context 605. Fragment of side-plate from a single-sided composite comb of low plano-convex section (L 40mm, W 16mm, Th 4mm), and identified as possible reindeer antler (Stephen Ashby pers. comm.). It has a straight lower edge with teeth indentations, and a gently curving back. There are incomplete rivet-holes with iron-staining at both ends. Much of the plate is plain, but three vertical lines clearly bordered an area of what appears to be angular interlace, with each band being composed of at least four incised lines (Figure 13.1). The low plano-

convex profile of this plate – with a depth-to-thickness ratio of >3.5:1 – might suggest a relatively early date for this comb. Moreover, the angular quality of the suggested interlace, together with its multi-stranded composition, indicates that it could belong to Ambrosiani's A3 group (see 'F1 or A3 combs' above), which is definitely represented at Cille Pheadair by SF 1127 (context 319, phase 3). If this fragment is reindeer antler, as provisionally identified by Ashby, then all these factors suggest that this comb was probably manufactured in Scandinavia.

2162 context 723. Tooth-plate with half a rivet-hole with iron corrosion staining on one edge, the other cut square, also with staining (L 22mm, W 25mm, Th 3mm). All teeth are intact with one exception. Wear in the form of horizontal striations is particularly apparent on the upper portion of the teeth on one side (Figure 13.1).

2172 context 607. Tooth-plate with a rivet-hole with iron corrosion staining on one edge, the other cut square (L 17mm, W 20mm, Th 2mm). All its teeth are broken (Figure 13.1).

2683 context 602. Fragment of side-plate from a single-sided composite comb of D-shaped section (L 27mm, W 11mm, Th 3mm). It has a straight lower edge with teeth indentations, and a straight back. There are incomplete rivet-holes with iron-staining at both ends. The plate is decorated with two near-parallel incised lines running along its centre (Figure 13.1). This side-plate's D-shaped profile and simple linear decoration identify it as belonging to Dunlevy's F2 class (1988: 364–6; see 'F2 and F3 combs' above).

Phase 2

2069 context 600. Single comb tooth (L 19mm).

2099 context 618. Single-sided end-plate with upturned back and concave outer edge (L 23mm, W 30mm, Th 2.5mm). These features are carved with a distinct angular faceted appearance. Three teeth survive intact and there are traces of iron corrosion at the break (Figure 13.1). Winged end-plates are typical of class F2 and F3 combs (see above).

2107 context 573. Comb case. Two small fragments of burnt antler, possibly from a comb case, which join to form part of a plate of sub-triangular section (L 13mm, W 8mm, Th 3mm). It is decorated with ring-and-dot motifs and a double incised margin, which defines its mitred ridge (Figure 13.1). The decoration and burnt condition of 2109 and 2205 make it likely that they belong to the same artefact as 2107.

2109 context 573. Comb case. Fragment of worn plate of sub-triangular section, probably from a comb case (L 30mm, W 10mm, Th 2.5mm). The fragment is white in appearance, possibly as a result of having been burnt. The outer edges are straight and outlined with an incised margin. Incised lines also define a central panel, one side of which has a double margin. Each side-panel contains a row of ring-and-dot motifs (Figure 13.1). This conjoins with 2205 and is probably from the same plate as 2107.

2120 context 622. Single comb tooth (L 18mm).

2132 context 582. Almost complete single-sided composite comb (L 168mm, W 29mm, Th 11mm). The end-plates do not survive and the eight surviving tooth-plates are worn and with damaged teeth, heavily notched on both sides. Five unevenly spaced corroded iron rivets survive to varying degrees and there are traces of a sixth. The side-plates have a relatively straight lower edge with a slight upturn on the sole surviving end. This upturn is mirrored by the profile of the gently curving back. The side-plates have a plano-convex profile, with a depth-to-thickness ratio of just less than 3.5:1. The only decoration on the polished side-plates is a finely incised contour along both the lower and upper margins (Figures 13.2, 13.7). The long, slightly curved profile of this comb with its raised ends and absence of decoration, with the exception of contoured margins, identify it with Ambrosiani's group B4 (1981: fig. 33; see 'B4 comb' above).

2186 context 618. Tooth-plate (L 17mm, W 18mm, Th 3mm). A rivet-hole with iron corrosion staining on one edge and most of one face; the other edge is cut square. All the teeth are broken, with the stubs on one face being very abraded with horizontal striations on one face, and the end pair of teeth are bent (Figure 13.1).

2203 context 582. Intact tooth-plate with a rivet-hole with iron corrosion staining on one edge and the other edge cut square (L 22mm, W 34mm, Th 2.5mm; Figure 13.1).

2205 context 572. Comb case. Fragment of plate of sub-triangular section (L 19mm, W 11mm, Th 3mm) which appears to have been burnt; probably from a comb case. The outer edges are straight and outlined with an incised margin. Incised lines define a central panel, one side of which has a double margin. Each side-panel contains a row of ring-and-dot motifs (Figure 13.1). This conjoins with 2109 and is probably from the same plate as 2107.

Phase 3

1127 context 319. Very worn single-sided composite comb fragment of probable reindeer antler (Stephen Ashby pers. comm.), comprising a fragment of side-plate originally riveted to a now detached tooth-plate (L 62mm, W 40mm, Th 15mm). The side-plate has a straight lower edge with a single contour and a gently curving back. The roughly worked chamfered edge at the end of the side-plate may be a reworked terminal, as it allows for an end tooth-plate of only 6mm width. The side-plate has a low plano-convex profile, with a depth-to-thickness ratio of >3.5:1. It is decorated with an incomplete central band of angular interlace with diagonally hatched infilling. A pair of vertical

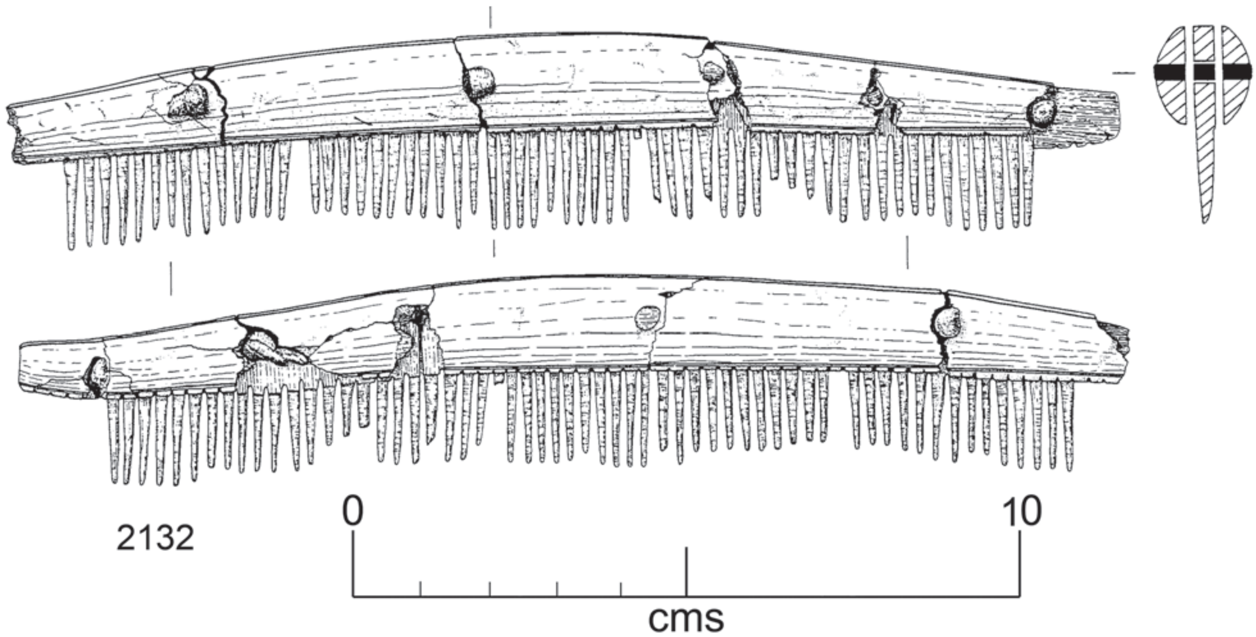

Figure 13.2. A near-complete comb (SF 2132) from phase 2

lines delineates this from a tapering sub-triangular field with diagonally incised lines. Above this a contour outlines the back of the side-plate with diagonal hatchings incised in the opposite direction. Two corroded iron rivets survive and there are the discoloured traces of two further examples. A single tooth-plate survives in association with the side-plate, with its 12 teeth heavily notched in their upper regions and only two of which are complete (Figures 13.1, 13.6). The low plano-convex profile of the surviving side-plate together its interlace decoration identify this comb fragment with Dunlevy's class F1 (1988: 362–3) and more specifically with Ambrosiani's group A3 (1981: fig. 4; see 'F1 or A3 combs' above). Reference has been made to the probable reworking of the side-plate terminal, and Ashby (pers. comm.) also notes that the decoration within the upper contour of the back-plate is highly atypical for type A3 combs, making it a probable later addition, particularly as a cruder carving technique has been employed. In addition, the worn appearance of the fragment suggests that this comb had an extended life. The riveting pattern, with a rivet at each tooth-plate junction as opposed to only every alternate one, suggests that this comb is likely to have been imported from Scandinavia, as does its probable manufacture from reindeer antler.

1305 context 328 (sample square 6307). Fragmentary end-plate from a single-sided comb, with damage to its outer and inner edges and three intact teeth, one now detached. Its back has a distinctive upturned end (L 18mm, W 27mm, Th 2mm; Figure 13.1). This winged end-plate is typical of class F2 and F3 combs (Dunlevy 1988: 364–5; see above).

1871 context 319. Single-sided end-plate with distinctive concave outer edge, flat back and broken inner edge, where traces of iron corrosion suggest the former presence of a rivet (L 27mm, W 24mm, Th 2mm). The teeth are damaged, leaving only one tooth that is almost intact and two stubs (Figure 13.1).

1980 context 137. Tooth-plate (L 20mm, W 32mm, Th 3mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square and five teeth survive intact.

2151 context 701. Fragmentary single-sided composite comb comprising the central portion of two side-plates with three severely damaged tooth-plates (L 105mm, W 29mm, Th 9mm). The side-plates have a straight lower edge with deliberate tooth indentations. They have a gently curving back and are of low plano-convex section. The side-plates are decorated with a pair of horizontal lines marking the median, in addition to contour lines along the upper and lower margins. In the presumed centres of the side-plates are bands of vertical lines, incised both above and below the double medial ridge (Figure 13.1). The low plano-convex section of this comb identifies it with Dunlevy's class F2 (1988: 364–5), though its ornament divided by the medial ridge is more typical of Dunlevy's F3 class (*ibid*.: 366–7), suggesting that it dates from the period between these two types (see 'F2 and F3 combs' above). Similar ornament was found on an A3 type comb accompanying a burial from Brough Road, Birsay (Morris 1989: ill. 154:315).

2180 context 465. Tooth-plate (L 17mm, W 15mm, Th 4mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is broken and all the teeth are broken (Figure 13.1).

2197 context 454. End fragment of a side-plate from a single-sided composite comb, attached by a corroded iron

rivet to a fragmentary tooth-plate with an irregularly cut upper margin (L 48mm, W 16mm, Th 11mm). The tooth-plate could be all that survives of an elaborate winged end-plate, but another explanation for the raised upper margin is that it could be a rather rough replacement, especially as the tooth-cuts on it do not correspond with the side-plate. The side-plate is of trapezoidal section. Its straight lower edge with incised margin has prominent tooth indentations which extend *c*. 4mm onto the lower panel, impinging on the underlying ornament. The tapering back has an incised margin. Crudely incised horizontal lines define a broad central panel decorated with a line of stamped ring-and-dot motifs. Clusters of diagonally incised lines, which alternate in direction, fill the side-panels (Figure 13.1). The cross-section and decoration identify this comb with Dunlevy's class F3 (1988: 366–7; see 'F2 and F3 combs' above).

2483 context 137. Tooth-plate (L 20mm, W 32mm, Th 3mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square. Five teeth survive intact (Figure 13.1).

Phase 4

1272 context 317. Fragment of an unusually thick tooth-plate with one straight edge with an iron rivet *in situ* close to it (L 7mm, W 33mm, Th 5mm). One now detached tooth survives.

1646 context 414. Approximately half a single-sided composite comb (L 104mm, W 32mm, Th 12mm). Three corroded iron rivets and traces of a fourth join the side-plates together. The side-plates are irregularly carved and decorated, but appear to have had a relatively straight lower edge and gently curving back, with a distinct upturn on one of the side-plate ends. This upturned end is not matched by its opposite number, but appears to have been intentional as it is mirrored in the line of the medial incision and probably relates to an unusual notch-cut to the rivet at this end. The side-plates have sub-triangular cross-sections, emphasized by a pair of horizontal lines marking the median, in addition to contour lines along the upper and lower margins, with very deliberate tooth indentations along the latter. A cluster of vertical lines, separately incised on the lower and upper facets, defines the outer edge of a central (now incomplete) band of decoration, comprising a running chevron in both the upper and lower fields, as separated by the medial pair of lines. Four tooth-plates survive in various conditions. The end-plate extends beyond the side-plates by 8mm and has rounded edges to its right-angled drop (Figures 13.3, 13.8). The sub-triangular cross-section and decoration of this fragment identify it with Dunlevy's class F3 (see 'F2 and F3 combs' above), with which the extended end-plate is also in keeping.

1792 context 366. Comb case? Fragment of bone plate with parallel straight sides and a sub-triangular cross-section, possibly a comb case fragment (L 30mm, W 10mm, Th 4mm). Its upper surface is ornamented with pairs of incised lines arranged in a row of saltire crosses. The absence of rivets and tooth indentations, together with the parallel sides, suggests that this fragment may belong to a comb case (see 'Comb cases' above). Comparable ornament is found on a comb case from Birsay (Curle 1982: ill. 49.231) and a comb case and combs from York (MacGregor *et al*. 1999: figs 897.7691; 888.7596, 7599) and combs from Dublin (Graham-Campbell 1980: no. 180).

1958 context 133. Single-sided end-plate, possibly of bone (Stephen Ashby pers. comm.), with a square end with slightly rounded outer edges (L 14mm, W 27mm, Th 2mm). The teeth are all broken and there are traces of a rivet-hole and iron corrosion (Figure 13.3).

1959 context 133 (E 15.15; N 102.75; OD 5.12). Single comb tooth (L 21mm).

2008 context 504 (sample square 7267). Small fragment of a single-sided composite comb with an iron rivet at the junction of two tooth-plates (L 20mm, W 18mm, Th 8mm). The straight-sided side-plates are of very shallow plano-convex section and appear to be decorated with a loosely incised chevron. The four intact teeth are short and of fine proportions (Figure 13.3). The narrow side-plates and short, fine teeth indicate that this fragment belongs to Dunlevy's class G (1988: 367–8; see 'G combs' above).

2012 context 544 (sample square 7136). Fragment of side-plate from a single-sided composite comb of sub-triangular section (L 36mm, W 10mm, Th 5mm). Incised contour lines decorate the upper and lower margins, which are almost straight, with deliberate regular tooth indentations along the latter. A pair of horizontal lines marks the raised medial ridge (Figure 13.3). There are traces of a vertical incision below a rivet perforation, presumably belonging to part of a now missing decorative scheme. A single corroded iron rivet survives *in situ*. This fragment joins with 2013 (context 544). The cross-section and decoration of these fragments place them in Dunlevy's class F3 (1988: 366–7; see 'F2 and F3 combs' above).

2013 context 544 (sample square 7133). Fragment of a single-sided composite comb comprising the ends of two side-plates joined by a corroded iron rivet with traces of a second (L 54mm, W 25mm, Th 11mm). One tooth-plate survives, as does an end-plate, which extends 7mm beyond the side-plates and has a slightly concave side profile and a faceted, possibly damaged, lower edge on one side. The side-plates are sub-triangular in profile, with a pair of horizontal lines marking the median. There are contour lines along the upper and lower margins of the plates. The lower edges of the narrow plate terminals appear straight, with deliberate, regular tooth indentations (Figure 13.3). This fragment joins with 2012 (context 544). The cross-section and decoration of these fragments place them in Dunlevy's class F3 (1988: 366–7).

2045 context 570. Side-plate fragment of a single-sided composite comb (L 47mm, W 12mm, Th 4mm). Its sub-

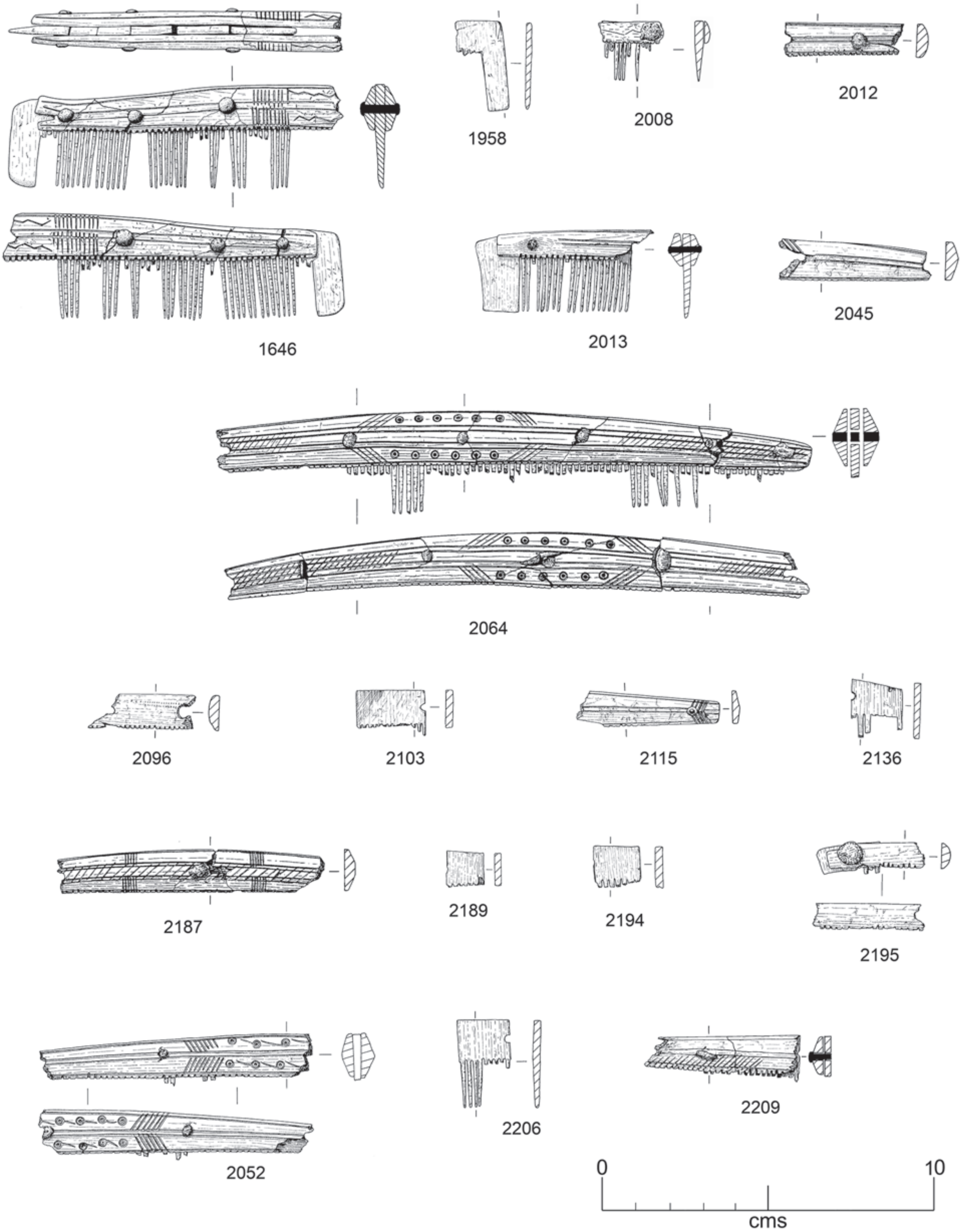

Figure 13.3. Comb fragments from phase 4

triangular section is emphasized by a pair of horizontal lines along the median, and there are incised contours marking the upper and lower margins. The upper edge is curved, but the lower edge is straight with tooth indentations. There is iron-staining around the remains of two rivet-holes, with the remains of incised herringbone decoration around the left-hand one (Figure 13.3). The cross-section and decoration place this fragment in Dunlevy's class F3 (1988: 366–7).

2052 context 474. Incomplete single-sided composite comb comprising fragments of two side-plates with one damaged tooth-plate (L 83mm, W 14mm, Th 11mm) joined by a

corroded iron rivet with staining from two further rivets. The side-plates have an approximately straight lower edge and a gently curving back. They are sub-triangular in section. The decoration on both faces comprises incised contour lines along the upper and lower margins, with a pair of horizontal lines marking the median. A line of connected ring-and-dot motifs decorates the upper and lower fields in the central portion of the comb which is contained within a diagonally hatched border arranged in a herringbone formation, without crossing the median. The tapering fields beyond are plain (Figure 13.3). The profile of this comb and its incised decoration identify it with Dunlevy's class F3. The connected ring-and-dot motif is a relatively common motif found, for example, on comb cases from York (Waterman 1959: pl. XIX.3) and also decorating the bowed hogback ridge of a comb from Jarlshof (Hamilton 1956: fig. 77.9).

2064 context 569. Almost complete single-sided composite comb, probably made from bone (Stephen Ashby pers. comm.), with substantial damage to its eight tooth-plates, and with little remaining of the end-plates (L 180mm, W 30mm, Th 12mm). There are traces of six corroded iron rivets, but the side-plates are now detached from one another. The side-plates have an approximately straight lower edge and gently curving backs, and are trapezoidal in section. The decoration is the same on both faces and comprises incised contour lines along both the upper and lower margins, with two pairs of horizontal lines highlighting the trapezoidal profile and dividing the decoration into three 'faceted' fields. In the central portion of the comb, the upper and lower panels are each decorated with a row of six ring-and-dot motifs contained within diagonally hatched borders. Diagonal hatchings also decorate the tapering medial panel, overlapping into its margins both above and below (Figure 13.3). The trapezoidal side-plates with their rectilinear ornament identify this comb with Dunlevy's class F3. Although similar decorative schemes can be found in Scandinavia (Blomqvist 1968: 27, Abb. 3; Mårtensson 1976: figs 288.4A, 291.26B), it is more likely that this comb was produced locally in the Western Isles or somewhere bordering the Irish Sea such as Dublin, where type F3 combs flourished from the tenth to twelfth centuries (Dunlevy 1988: 366–7). There is a close parallel from Lough-a-Trim, Co. Westmeath (*ibid*.: fig. 8.1).

2096 context 569. Fragment of a polished side-plate from a single-sided composite comb of plano-convex section (L 32mm, W 11mm, Th 3mm), possibly manufactured from bone (Stephen Ashby pers. comm.). The fragment is undecorated, but there are two faint rows of tiny vertical scores. Both the upper and lower margins are flat, with tooth indentations along the latter (Figure 13.3). There are corrosion stains around the incomplete rivet-holes at either end. The proportions and parallel sides of this fragment identify it with Dunlevy's type G series (1988: 367–8).

2103 context 569. Tooth-plate (L 21mm, W 13mm, Th 2mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square and all the teeth are broken away (Figure 13.3).

2115 context 569. Fragment of side-plate terminal from a single-sided composite comb (L 43mm, W 10mm, Th 3mm). The sub-triangular cross-section is emphasized by a pair of horizontal incised lines. Incised contours also decorate the upper and lower margins, the former having a slight taper and the latter being straight with tooth indentations. A single iron rivet is positioned close to the terminal, to the left-hand side of some herringbone ornament which impinges on the incised contours (Figure 13.3). The form and decoration identify this fragment with Dunlevy's F3 class (1988: 366–7).

2136 context 569. Tooth-plate (L 16mm, W 17mm, Th 2mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square and all the teeth are fragmentary (Figure 13.3).

2187 context 552. Two joined fragments of side-plate comprising the central portion of a single-sided composite comb (L 80mm, W 13mm, Th 6mm). A single corroded iron rivet survives *in situ* and there are stains from two further examples. The straight lower edge has tooth indentations and the back is hogbacked. Incised contours decorate the upper and lower margins and a pair of double contours defines a broad, flat, central band, giving the plate a trapezoidal cross-section. This broad band is decorated with diagonal incisions that extend slightly beyond the double contouring in places. Four tightly clustered groups of vertical incisions are positioned in the otherwise plain panels above and below the central band, almost equidistant from the central rivet (Figure 13.3). The trapezoidal cross-section and linear ornament identify this fragment with Dunlevy's F3 class (1988: 366–7).

2189 context 548 (sample square 7101). Tooth-plate (L 11mm, W 11mm, Th 2mm). Traces of a rivet on one edge; the other edge is cut square and all the teeth are broken away (Figure 13.3).

2194 context 126. Tooth-plate (L 14mm, W 13mm, Th 2mm). Traces of a rivet and iron corrosion staining on one edge; the other edge is cut square and all the teeth are broken away (Figure 13.3).

2195 context 504 (sample square 7267). End fragment of a slender, single-sided composite comb (L 33mm, W 6mm, Th 7mm), comprising the terminals of two fragmentary side-plates with fragments of two tooth-plates sandwiched between. The side-plates are of plano-convex section and plain with only tooth indentations along the straight lower edge. There is a slight curve to the back. The end rivet survives *in situ* and is corroded iron. The end-plate is damaged, but extended beyond the side-plates and had a concave profile (Figure 13.3). The slender proportions

and straight back of this undecorated comb identify it with Dunlevy's class G (1988: 367–8).

2199 context 504 (sample square 7267). Fragment of tooth-plate with traces of iron-staining (L 9mm, W 7.5mm, Th 2mm). There are six detached fine teeth.

2206 context 548 (sample square 7091). Fragmentary tooth-plate with half a rivet-hole on one edge and the other edge cut square (L 16mm, W 27mm, Th 2mm). Four teeth survive intact (Figure 13.3).

2209 context 504. Fragment of side-plate of a composite comb, with two attached, fragmentary tooth-plates and one corroded iron rivet *in situ* (L 47mm, W 14mm, Th 8mm). The side-plate has a straight lower edge with deliberate tooth indentations, and a tapering back, both of which have incised margins. A pair of horizontal lines decorates the medial ridge, emphasizing the plate's sub-triangular section. An extended group of diagonally incised lines fills much of the lower panel (Figure 13.3). The cross-section and decoration identify this fragment with Dunlevy's F3 class (1988: 366–7).

2768 context 548 (sample square 7075). Broken comb-tooth (L 11mm).

2770 context 504 (sample square 7184). Broken comb-tooth (L 8mm).

Phase 5

1247 context 010. Both edges of this tooth-plate have half a rivet-hole with iron corrosion (L 14mm, W 17mm, Th 2mm). Four teeth survive, one of which is detached.

1269 context 010. Three fragments belonging to a single-sided composite comb (L 22mm, W 9mm, Th 11mm), comprising two lengths of side-plate and a fragmentary tooth-plate with no teeth surviving. The two side-plate fragments each have a corroded iron rivet with staining at the opposite end. They have approximately straight upper and lower edges, with tooth indentations more prominent on the lower edge of one fragment than the other. They are decorated with incised margins and a central panel of short, transverse incisions, giving a rope-like appearance (Figure 13.4). The plates have sub-triangular sections. It is most likely that these two fragments were linked back-to-back by the rivets, with the tooth-plate between, and it is for this reconstruction that the dimensions are given. These fragments have the same proportions and decoration as 1621 and 1624 from the same context, and it is likely that they belong to a single comb. The narrow, low plano-convex profile of the side-plates, together with fine tooth indentations and closely spaced rivets, suggests that the comb belongs to Dunlevy's class G (1988: 367–8).

1277 context 010. Tooth-plate (L 15mm, W 17mm, Th 2mm). The piece is smoothed flat on both sides and broken at both ends along the line of rivets. There are eight incised notches, four stubs of broken teeth and four teeth 11.5mm long on one edge (Figure 13.4).

1278 context 023. Small fragment of side-plate from a single-sided composite comb (L 15mm, W 8mm, Th 11mm). It has an incised contour along its upper edge and a corroded iron rivet attaching it to a fragment of tooth-plate.

1503 context 351. Reused comb case? Bone fragment of a possible comb case (L 35mm, W 18mm, Th 8mm), with rectilinear openwork ornament, through one possibly T-shaped portion of which a lead-composite backing has extruded. A pair of longitudinal lines crossed by faint transverse hatchings divides this opening from a crenellated row of cuts. The fragment has a lightly bowed profile and there are iron corrosion stains suggestive of rivets at either broken end (Figures 13.4, 13.9). On the reverse is a lead-composite backing, with both horizontal and transverse incisions through it. The paired longitudinal lines with cross-hatchings, slightly bowed profile and traces of iron rivets are features typical of a composite comb's side-plate.

The possible T-shaped opening and decorative use of metalwork within this openwork design is a feature of a series of false-ribbed combs with arched backs that are of twelfth- and thirteenth-century Scandinavian origin (MacGregor 1985: 91), but T-shaped and rectilinear openings with metalwork backing occasionally feature on other comb types including Ambrosiani's type A combs (with examples from Clifford Street, York [*ibid*.: fig. 50c] and Oslo [Wiberg 1977: fig. 5]), and Dunlevy's type F combs in Ireland (1988: 363), suggesting caution in applying too specific a date to this type of openwork ornament. Sheet copper alloy was the usual backing material for such openwork decoration, but the lead backing in the Cille Pheadair case would appear to be secondary as it has been so crudely applied. It is also possible that the Cille Pheadair fragment did not originally belong to a comb, as it appears to have stepped surfaces on both sides, providing no straight edge for teeth (unless the original plate was exceptionally deep).

1602 context 389. Single-sided end-plate with splayed outer edge (now broken in two) and slight upturn to back (L 20mm, W 26mm, Th 2.5mm). There are traces of iron corrosion around the rivet-hole. Three teeth survive intact and there is a further detached tooth. This fragment is extremely worn, with its original thickness preserved where the side-plate was attached, now visible as a slightly raised sub-rectangular outline. The end-plate originally extended *c*.10mm beyond the side-plate, which appears to have had a raised back (Figure 13.4). The extension of the splayed end-plate beyond the side-plate is typical of F2 and F3 combs in Ireland (Dunlevy 1988: 364–5).

1621 and 1624 context 010. Fragments of a single-sided composite comb (L 40mm, W 12mm, Th 10mm) composed

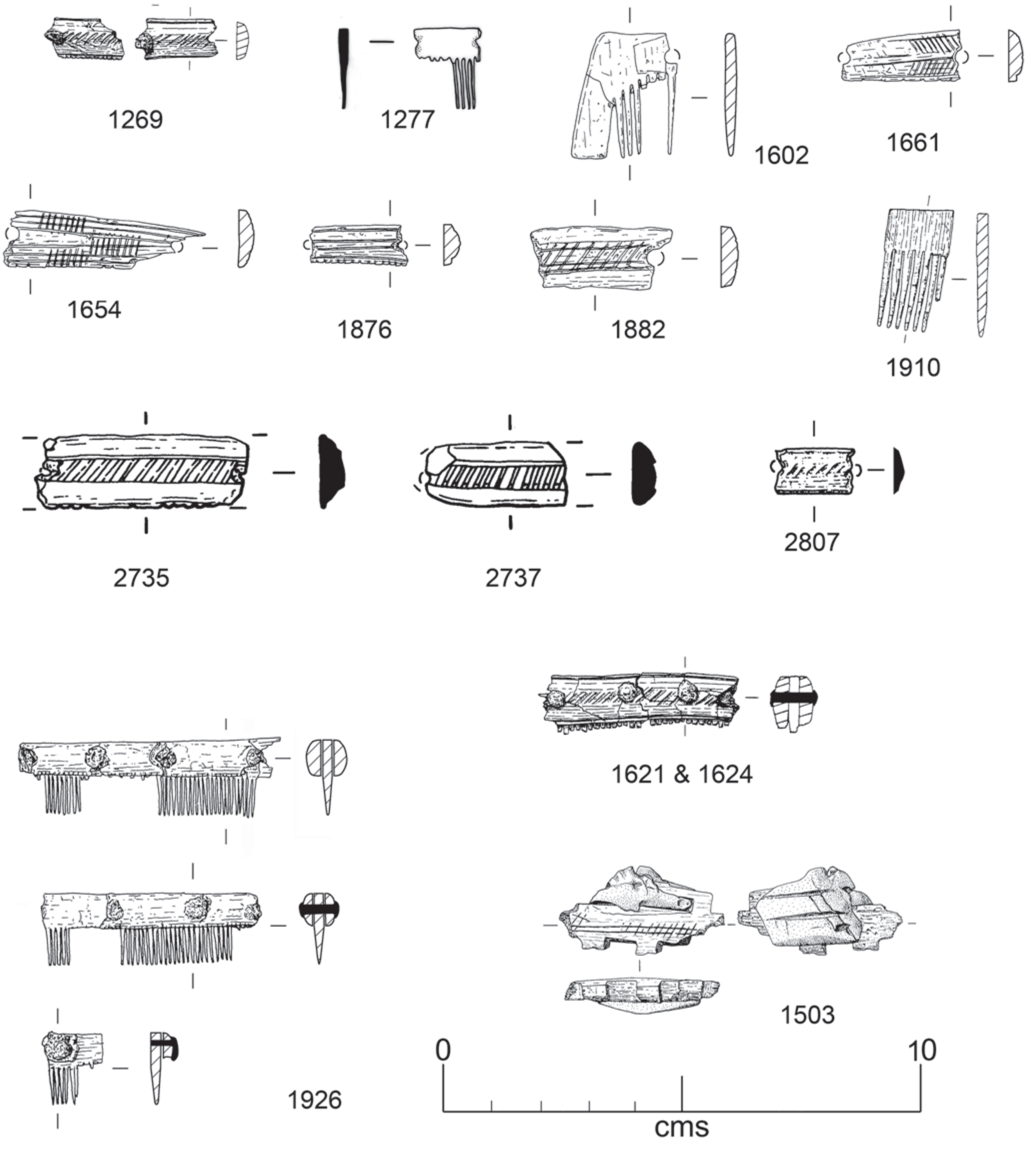

Figure 13.4. Comb fragments from phase 5

of two lengths of side-plate, with three damaged tooth-plates sandwiched between by three corroded iron rivets and a now detached fourth rivet. The side-plates have straight upper and lower edges, distorted by their fragmentary state yet still displaying a slight taper. Along the lower edge tooth indentations are particularly prominent on one side. The plates are sub-triangular in section. They are decorated with incised contours along both the upper and lower margins and have a central panel of short, transverse incisions of rope-like appearance (Figure 13.4). This portion of comb has the same decoration and proportions as 1269 from the same context, and it is likely that they belong to a single comb. The narrow plano-convex side-plates and closely spaced rivets identify it with Dunlevy's class G (1988: 367–8).

1654 context 308. Fragmentary side-plate from a single-sided composite comb (L 42mm, W 11mm, Th 3mm), possibly manufactured from bone (Stephen Ashby pers.

comm.). It has a straight lower edge with teeth indentations, and a tapering back, and is of trapezoidal section. There are incomplete rivet-holes with iron-staining at either end. Its decoration comprises three parallel lines along both the base and back, with the innermost ones meeting at the tapered end. A cluster of short, almost vertical lines is incised over this junction, with two further clusters crossing the triple margins to the left (Figure 13.4). The form and decoration of this comb identify it with Dunlevy's class F3, with its ornament closely paralleling 2484 (phase 8). Alternating clusters of parallel lines are found on an F3 comb from Lough a Trim (Dunlevy 1988: 414) and a comb from Hedeby (MacGregor 1985: fig. 50).

1661 context 507. Fragment of a side-plate end from a single-sided composite comb (L 24mm, W 10mm, Th 3mm), possibly manufactured from bone as opposed to antler (Stephen Ashby pers. comm.). It has a straight lower edge with tooth indentations, and a gently curving back. Its section appears to be plano-convex, but was probably sub-triangular originally and has altered through wear. There are incomplete rivet-holes with iron-staining at both ends. The decoration comprises incised contours along both the upper and lower margins, with a pair of horizontal lines marking the median and dividing the plate into two fields which have diagonal hatchings arranged in a herringbone formation that respect the central band (Figure 13.4). This is a fragment of an F3 comb (Dunlevy 1988: 366–7).

1752 context 351. Fragment of a tooth-plate (L 12mm, W 16mm, Th 3mm) with one edge cut square and traces of a rivet-hole and iron-staining on the other. All teeth are broken away.

1775 context 313. Intact tooth-plate (L 19mm, W 24mm, Th 3mm) with traces of rivet-holes and iron-staining on both edges. Thirteen fine teeth survive intact.

1873 context 313. Tooth-plate (L 17mm, W 13mm, Th 2mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square and all the teeth are broken away.

1874 context 010. Tooth-plate (L 18mm, W 17mm, Th 3mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square and all the teeth are broken away.

1875 context 351. Tooth-plate (L 22mm, W 16mm, Th 3mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square and all the teeth are broken away.

1876 context 315. Small fragment of side-plate from a single-sided composite comb (L 20mm, W 8mm, Th 3mm), with sub-triangular section emphasized by a pair of horizontal lines marking the median, in addition to contour lines along the upper and lower margins of the plate. Regular indentations from teeth-cutting are prominent along the straight lower edge and the upper margin appears to taper slightly to the left (Figure 13.4). There is slight iron-staining at either end, suggesting this section broke between rivets. This is a fine fragment of a Dunlevy class F3 comb.

1882 context 351. Small fragment of worn side-plate from a single-sided composite comb with a low plano-convex profile and a depth-to-thickness ratio of just less than 3.5:1 (L 30mm, W 12mm, Th 4mm). The plate has worn sides distorted by damage. The decoration comprises a broad medial band with raised edges and transverse incisions between, which in places impinge on the edges. The manner of carving gives the appearance of rope-work (Figure 13.4). Staining in a fragmentary perforation indicates the former presence of an iron rivet. Such a low plano-convex profile may suggest an early date for this fragment. However, the crudely worked, medially aligned decoration is more in keeping with later F3 combs.

1910 context 533. Tooth-plate (L 14mm, W 27mm, Th 3mm). Both edges square, and a slight iron corrosion stain on one edge. All teeth intact except for one (Figure 13.4).

1926 context 547. Three fragments of a single-sided composite comb (L 55mm, W 17mm, Th 10mm; L 46mm, W 16mm, Th 10mm; L 11mm, W 14mm, Th 6mm). The three fragments do not join directly with each other. There were originally at least ten tooth-plates with iron rivets, making this a slender comb of at least 140mm in length. In the sections that survive there are rivets at the junction of each tooth-plate. Blocks of intact, short teeth survive, finely cut with approximately 11 per 10mm (Figure 13.4). The narrow side-plates are of D-shaped plano-convex section and undecorated, though the surface is polished. The lower edge is straight with just a slight taper to the upper edge. Both end-plates are missing. The length and proportions of this comb with its finely cut teeth identify it with Dunlevy's class G, illustrated by a close parallel from Winetavern Street, Dublin (Dunlevy 1988: 367–8, fig. 9.2). The comb had head louse eggs attached to the teeth, and certainly class G combs with their close density of fine teeth would be suited to acting as a nit comb, though their widespread popularity would appear to be a reflection of a general fashion trend, possibly associated with improved levels of personal hygiene.

2735 context 420. Fragment of side-plate from a single-sided composite comb (L 43mm, W 16mm, Th 5mm), broken on the iron rivets. It is decorated with two parallel lines enclosing wide, angled lines, with single incised lines along each long edge (Figure 13.4).

2737 context 351. Fragment of side-plate from a single-sided composite comb (L 28mm, W 12mm, Th 5mm), broken at one end on the rivet-hole. It is decorated with two parallel lines enclosing wide, angled lines, with a third incised line adjacent and parallel to the top line (Figure 13.4).

2807 context 010. Fragment of side-plate from a single-sided composite comb (L 15mm, W 9mm, Th 2mm), broken at one end on the rivet-hole. It is decorated with two parallel lines along each long edge, enclosing wide, angled lines (Figure 13.4).

Phase 6
1571 context 341. Almost intact single-sided tooth-plate (L 13mm, W 25mm, Th 2mm). Both edges are cut square, and all the teeth survive, with just one broken at its tip; wear particularly obvious on one side.

1639 context 398. Tooth-plate (L 15mm, W 25mm, Th 3mm). Half a rivet-hole with iron corrosion staining on one edge; the other edge is cut square. Nine teeth, seven of which survive intact.

1872 context 367. Worn fragment of side-plate from a single-sided composite comb (L 39mm, W 13mm, Th 3mm), with traces of rivet-holes and iron corrosion at either end. It has a flattened sub-triangular section. It has a pair of horizontal lines marking the slight median ridge and contour lines along both the upper and lower margins of the plate, which are almost straight, with clear indentations where the teeth were cut along the lower margin. A cluster of transverse lines decorates an area between the median lines and upper contour margin (Figure 13.5). The flattened profile of this comb may suggest that it belongs to Dunlevy's F1 class, but the division of fields, combined with its unsophisticated ornament, are more in keeping with Dunlevy's class F3 (1988: 366–7).

Phase 7
1009 context 020. End fragment of a side-plate from a single-sided composite comb (L 32mm, W 11mm, Th 5mm). The fragment has a single corroded iron rivet and traces of another at the break. It has a straight lower edge with deliberate tooth-cutting indentations and a worn, incised margin. Its upper edge tapers and might also have had an incised margin, now barely visible. The plate is sub-triangular in section, with its ridge emphasized by a pair of horizontal incised lines, now very worn. The panel above is decorated with a group of incised diagonal lines (Figure 13.5). The cross-section and decoration of this fragment identify it with Dunlevy's class F3 (1988: 366–7).

1010 context 020. Fragment of a slender, single-sided composite comb (L 24mm, W 9mm, Th 10mm), comprising sections of both side-plates joined by two corroded iron rivets with two fragmentary tooth-plates positioned between. The side-plates have approximately straight lower edges, with prominent tooth indentations on one side. The backs are also approximately straight, though distorted by splits caused by the corroding rivets. The side-plates are plano-convex in section. The decoration comprises finely incised contours along both the upper and lower margins, with a pair of horizontal lines defining a central panel of transverse incisions, with raised sections between of rope-like appearance (Figure 13.5). The straight sides, plano-convex cross-section and slender proportions of this fragment suggest that it belongs to Dunlevy's class G (1988: 367–8). This fragment has the same decoration and slender proportions as 1276, also from context 020, with which it joins. These fragments are similar to others from Cille Pheadair, including 1269 and 1621/1624 (phase 5).

1024 context 036. Fragment of a single-sided composite comb (L 48mm, W 12mm, Th 10mm), comprising a fragmentary side-plate still attached by an iron rivet to a tooth-plate, together with an adjoining tooth-plate (now detached). The side-plate has a straight lower edge with some tooth indentations, and a slightly tapering back. It has a flattened plano-convex section and is decorated to one side with a group of transverse incisions. The tooth-plates are damaged, with no surviving teeth (Figure 13.5). The cross-section and decoration of these fragments closely parallel those of 2485 from the same context, identifying it with Dunlevy's class F2. Cross-hatching with diagonal extensions is paralleled on a tenth-century comb from Coppergate, York (MacGregor *et al*. 1999: fig. 890.6781), where combs with plano-convex profiles were common (*ibid.*: 1930). This raises the possibility that the F2 combs found at Cille Pheadair, of which there are only six, might have been imported, with Ireland being the most likely source.

1276 context 020. Fragment of a slender, single-sided composite comb (L 38mm, W 9mm, Th 10mm), comprising a side-plate section attached by a corroded iron rivet to a damaged tooth-plate. The side-plate has approximately straight upper and lower edges, with tooth indentations along the latter. It is plano-convex in section. The decoration comprises finely incised contours along the upper and lower margins, with a pair of horizontal lines marking a central panel of transverse incisions, giving the raised areas in between a rope-like appearance (Figure 13.5). The straight, narrow sides and plano-convex cross-section of this fragment suggest that it belongs to Dunlevy's class G (1988: 367–8). This fragment has the same decoration and slender proportions as 1010 from the same context, with which it joins. These fragments are similar to others from Cille Pheadair, including 1269 and 1621/1624 (phase 5).

1290 context 022. Fragment of tooth-plate with no surviving teeth (L 11mm, W 16mm, Th 2mm). It has three cut notches and the stubs of four teeth.

1303 context 060 (sample square 6060). Single comb tooth (L l7mm, W 1.5mm, Th 1mm).

1476 context 375. Two fragments of side-plate from a single-sided composite comb (L 59mm, W 8mm, Th 8mm). The fragments were originally joined back-to-back (dimensions are given accordingly) by two iron rivets

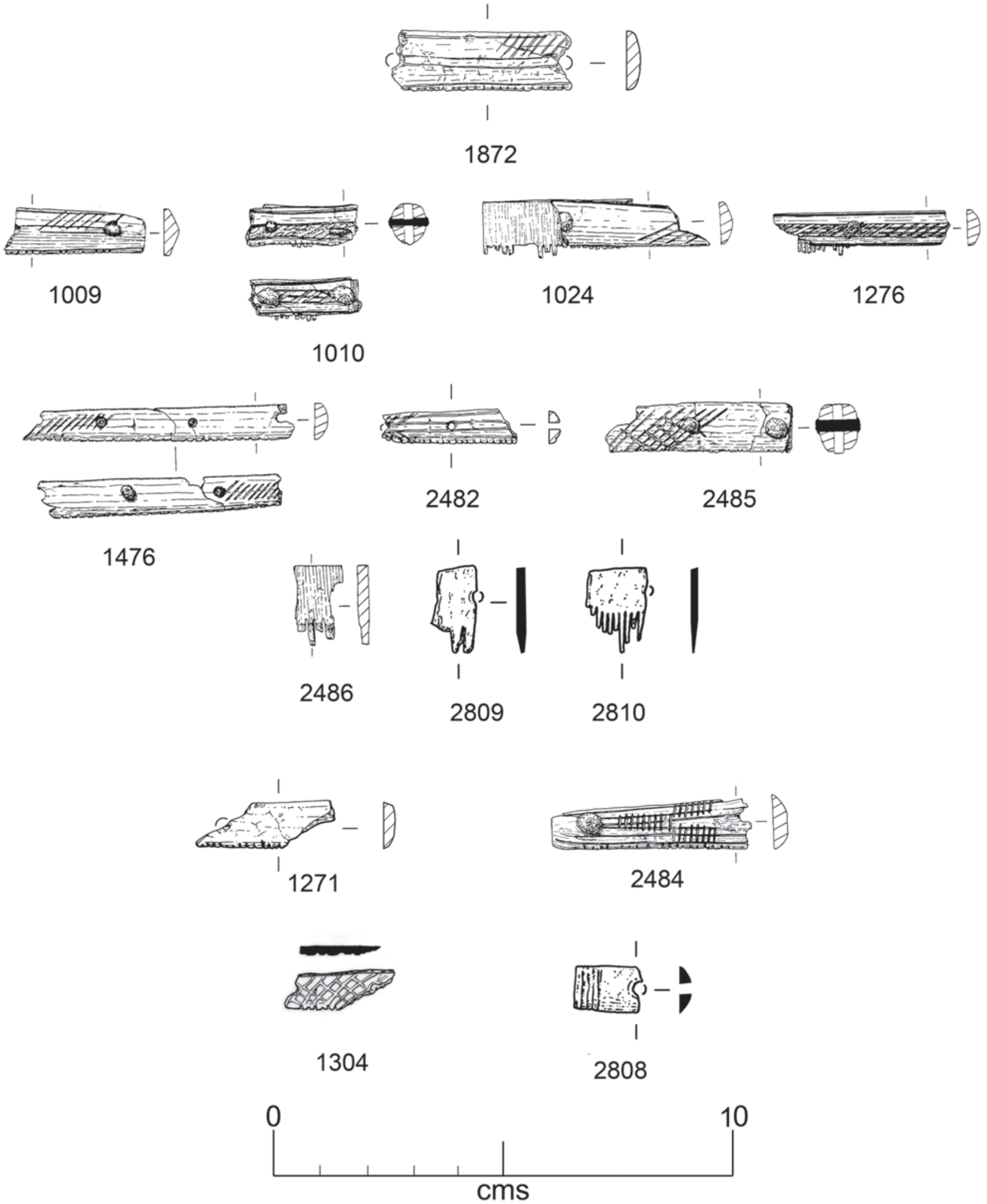

Figure 13.5. Comb fragments from phases 6, 7, 8 and 9

with a tooth-plate (now missing) between. The side-plates have straight lower edges with tooth indentations, and a slight taper to their upper edges. Their sections are plano-convex, and they each have a small group of incised transverse lines towards the tapered end, but are otherwise undecorated (Figure 13.5). The absence of tooth-plates, together with the presence of two incomplete rivet-holes on each plate that do not contain rivets or display corrosion, suggests that this comb was incomplete at the time of its deposition. The narrow, almost parallel-sided plates of plano-convex cross-section place this comb in Dunlevy's class G (1988: 367–8).

2482 context 116. Small fragment of side-plate from a single-sided composite comb (L 29mm, W 7mm, Th 3mm), with sub-triangular section emphasized by a pair of horizontal lines marking the median, in addition to contour lines along the upper and lower margins of the plate. Diagonal hatchings arranged in a herringbone formation decorate the left-hand end of the plate, respecting the central band (Figure 13.5). Regular indentations from teeth-cutting are prominent along the straight lower edge, and the straight upper margin tapers towards the left. There is an incomplete rivet-hole with slight iron-staining at this end *c.* 13mm distant from a complete rivet-hole which in turn is a similar distance from the other break. It is a fine fragment of a Dunlevy class F3 comb.

2485 context 036 (sample square 6027). Fragment of a single-sided composite comb (L 41mm, W 11mm, Th 11mm), comprising sections of both side-plates joined together by two corroded iron rivets with damaged tooth-plates between. The side-plates have approximately straight upper and lower edges with tooth indentations along the latter. They have low plano-convex sections. The decoration on each plate comprises an undecorated area adjoining a group of transverse incisions across the width of the plate, which is cross-hatched in a rather haphazard manner (Figure 13.5). The decoration and proportions of this fragment closely parallel those of 1024 from the same context. The low plano-convex section identifies this comb with Dunlevy's class F2.

2486 context 300 (sample square 6074). Fragment of tooth-plate (L 11mm, W 17mm, Th 2.5mm) with no intact sides or teeth (Figure 13.5).

2809 context 311. Fragment of tooth-plate (L 17mm, W 8mm, Th 2mm) with no surviving teeth. It has two cut notches and the stubs of two teeth (Figure 13.5).

2810 context 311. Fragment of tooth-plate (L 17mm, W 14mm, Th 2mm). It has three surviving teeth and the stubs of six teeth (Figure 13.5).

Phase 8

1271 context 034. Undecorated side-plate fragment from a single-sided composite comb (L 29mm, W 9mm, Th 3mm). The lower edge is straight with tooth indentations and a faintly incised margin, while the upper edge has a slight taper (Figure 13.5). The plate has a low plano-convex section. There are traces of iron corrosion on the left-hand break. The cross-section of this fragment identifies it with

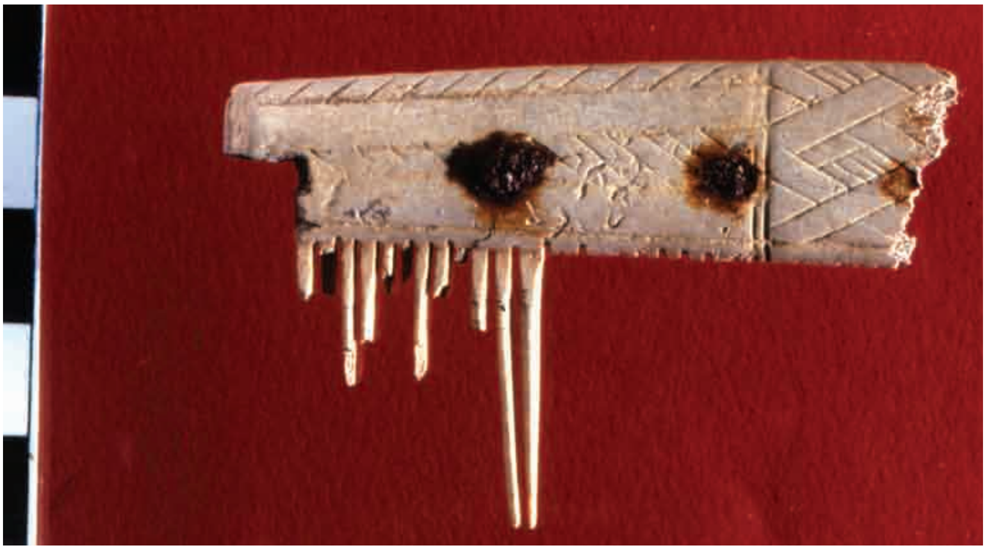

Figure 13.6. A comb fragment (SF 1127) from phase 3

Figure 13.7. A near-complete comb (SF 2132) from phase 2

Dunlevy's class F2, popular throughout the Scandinavian world, with finds from Dublin dating from the late ninth to early twelfth centuries (see above), whence this example may have come.

1284 context 004 (sample square 7). Undecorated side-plate fragment from a single-sided composite comb (L 17mm, W 9mm, Th 2.6mm). The lower edge is straight with tooth indentations, while the upper edge has a slight taper. The plate has a low plano-convex section. There are slight traces of iron corrosion at one of the broken ends. This fragment is too small and undiagnostic to identify its comb type.

2484 context 091 (sample square 6116). Fragmentary side-plate from a single-sided composite comb (L 44mm, W 11mm, Th 11mm), possibly manufactured from bone (Stephen Ashby pers. comm.). It has a straight lower edge with tooth indentations, and a tapering back; it is of trapezoidal section. One corroded iron rivet is *in situ* and there is staining from a further example at the break. Its decoration comprises three parallel lines along both the base and back, with the innermost ones meeting at the rivet. A cluster of short, almost vertical lines is incised over this junction, with two further clusters crossing the triple margins above and below immediately to the right (Figure 13.5). The trapezoidal cross-section of this fragment together with its parallel-line motifs identifies it with Dunlevy's F3 class. This fragment closely parallels 1654 (phase 5), and alternating clusters of parallel lines in three panels are also found on combs from Lough a Trim (Dunlevy 1988: fig. 8.1), Clifford Street and Coppergate, York (Waterman 1959: fig. 16.2; MacGregor *et al*. 1999: fig. 886.7579) and Hedeby (MacGregor 1985: fig. 50).

Phase 9

1304 context 087 (sample square 6113). Fragment of side-plate from a single-sided composite comb with a flattened plano-convex section (L 24mm, W 8mm, Th 3mm). It has a straight lower edge with teeth indentations, and a gently curving back. It is decorated with cross-hatched lines (Figure 13.5). There are traces of iron corrosion from former rivets at both its broken ends. The low plano-convex section of this comb identifies it with Dunlevy's F2 class (see above). Cross-hatching also decorates comb fragments 1024 and 2485 (phase 7).

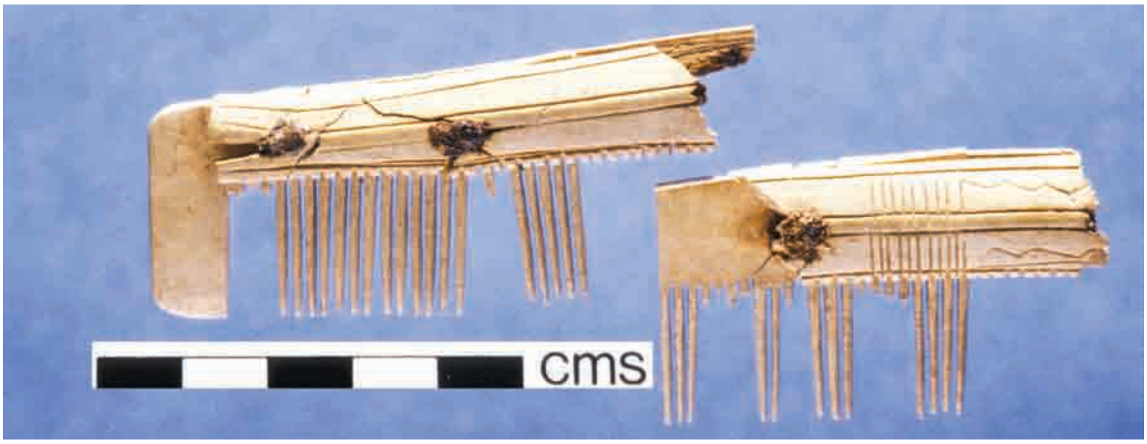

Figure 13.8. A comb fragment (SF 1646) from phase 4

Figure 13.9. A fragment of a possible comb case with lead backing (SF 1503) from phase 5

2808 context 070. Fragment of side-plate terminal from a single-sided composite comb (L 13mm, W 8mm, Th 3mm), broken at one end on the rivet-hole. It is decorated with four parallel lines incised vertically beside the terminal (Figure 13.5).

Unstratified

2049 unstratified. Single comb tooth.

13.2 Bone pins

Bone pins are notoriously difficult to categorize and date, limiting their value as chronological indicators. Some types, such as perforated pig fibulae, span centuries and exhibit few diagnostic elements, whilst others are elaborately decorated, reflecting the fashion of the day.

The exact function of bone pins is not easy to determine (MacGregor 1982: 91–2), though the majority of pins from Cille Pheadair are likely to have been used as dress-fasteners, based on their hipped or swollen shanks, with yarn probably securing the perforated examples (Wilson 1983). Some of the smaller pins might have pinned hair, and the perforated examples probably functioned as needles, ranging from fine sewing examples to larger ones for tasks such as single-needle knitting or *nålbindning* (Lindström 1976: 275).

Pre-Norse pin

The only certain pre-Norse pin from Cille Pheadair is a short, hipped example with a flat-topped acorn head (SF 2152; Figure 13.10) from the floor of the first stone longhouse (phase 3). There are numerous finds of this type from Pictish levels at the Brough of Birsay (Curle 1982: 19, ill. 7) and Pool, Sanday (Smith 2007: 473, ill. 8.8.7), with the type continuing in use up to the Norse period at these sites and elsewhere, with further parallels from Buckquoy (Ritchie 1977: figs 4.10–11, 14), Jarlshof (Hamilton 1956: figs 59.2, 5) and Freswick (Curle 1939: pl. XLVIII.7–9). Examples of the type from the Western Isles include finds from A'Cheardach Mhor, South Uist (Young and Richardson 1960: figs 13.27–8), and Dun Cuier, Barra (Young 1956: pl. 20).

Hipped shanks appear to have been a native fashion, with most dated examples coming from pre-Norse contexts (Foster 1989: 67). Those that come from Norse contexts are likely to be stratigraphically residual, as there is no evidence for hipped shanks on pins that are distinctively Norse (*ibid*.). However, there was a further *floruit* of the type in the eleventh and twelfth centuries (MacGregor 1985: 121), though most of these later examples have more elaborate pin-heads, some with additional perforated loops at their apex. Since there are no Pictish levels beneath Cille Pheadair, this pre-Norse pin from the floor of the first stone longhouse was presumably a curated item, retained until deposition in the eleventh century.

Norse-period pins

With the increased use of antler during the Norse period, pins became considerably longer: pins reaching lengths greater than 70mm are generally ascribed to this period (Foster 1989: 55). Moreover, certain types of pin-head can be specifically identified as Norse. At Cille Pheadair, the long-headed thistle-headed pin from phase 5 is one such example (SFs 1302/1051; Figure 13.12). The perforated, expanded, paddle-shaped series would also appear to have been specifically Norse, with elements of the Ringerike style in the union knot incised on SF 1781 (also phase 5) confirming this. Other pin types, such as the ball-headed variety (SF 1301; Figure 13.13; phase 9) and the modified pig fibula class, experienced renewed popularity during this period.

Pig fibula pins

The pig fibula series, of which there are several examples from Cille Pheadair, was created by the articular end of a pig's fibula being cut down to form the head which was subsequently perforated in many cases (e.g. SFs 2092 and 2200; Figure 13.10). These pins have a long history of manufacture and use, dating from the Iron Age and continuing into the Viking and early medieval periods (MacGregor 1985: 120–1), within both the British Isles and Scandinavia. They are thought to have functioned as dress pins (*ibid.*).

Nail-headed pins

Nail-headed pins from Cille Pheadair include SF 1707 (phase 5), SF 1832 (phase 5; Figure 13.12) and SF 1867 (phase 4), the last two with incised crosses decorating their flat heads. They are found on many sites from the Roman period onwards (MacGregor 1985: 117–18), with Norse examples having been recovered from York (Waterman 1959: fig. 14.32) and Jarlshof (Hamilton 1956: figs 69.7, 9). A sizeable group came from the Middle Norse horizon at Birsay (Curle 1982: ill. 48) and a similar cross-incised nail-head came from Pool, Sanday (Smith 2007: ill. 8.8.9: PL5120). Nail-headed pins are also known from Viking contexts in South Uist at Drimore (MacLaren 1974: pls 2.25–6) and A'Cheardach Mhor (Young and Richardson 1960: figs 13.24–7).

Bun-shape headed pins

Bun-shaped pin-heads comprise a small group, with just two unprovenanced examples from the Western Isles (Foster 1989: 96) and one (SF 2155; Figure 13.10) from pit fill 711 (phase 1) at Cille Pheadair.

Four-sided faceted headed pins

SF 2126 is a four-sided faceted pin-head with a flat, square top, from context 582 in phase 2 (Figure 13.10). The

change in the shank's section from round to square below the mid-portion of the shank is a feature of later metal stick-pins from twelfth- or thirteenth-century contexts in Dublin (O'Rahilly 1973: 94).

Large expanded-headed pins

Large expanded-headed, or occasionally paddle-shaped, pins are present at Cille Pheadair from phase 4 to phase 7. The function of these pins has been the subject of recent debate, with suggestions ranging from their use in tapestry to use as netting needles, but with Wilson concluding, in the light of Scandinavian parallels of both metal and bone, that such pins were dress pins, with string helping to secure them to loosely woven garments (Wilson 1983). This series flourished in the Viking period and includes several examples with elaborately ornamented heads, mainly reflecting the Ringerike and Urnes styles and dating from the eleventh century onwards (Schwarz-Mackensen 1976: 40).

Ringerike motif

The large expanded bone pin-head SF 1781 from pathway 534 (phase 5; Figure 13.12) most probably functioned as a dress pin. It is broken at the perforation, which is set low in the head. Its incised ornament consists of two confronted tendrils joined by a union knot and separated by a triangular offshoot. The motif fills most of the head and is framed by a single incised line along the sides and the lower end, while the upper end of the frame forms a spiral.

This ornament reflects elements of the Ringerike style, with its pairs of juxtaposed tendrils and central union knot. The triangular addition to the union knot is a common device found on the union knots that link rune-inscribed ribbon bodies on runestones (Christiansson 1959: fig. 108), and on some Anglo-Scandinavian stirrup-strap mounts (Williams 1997: fig. 20.10), the origin behind this class A-type mount being Scandinavian. The paired symmetry of the interlace with its triangular knot addition is reminiscent of the design on a large expanded triangular pin-head from Trondheim (Roesdahl and Wilson 1992: 337, no. 421b). Moreover, spirals frequently adorn this type of pin-head, filling the whole head on broad examples from Sigtuna (Schwarz-Mackensen 1976: Abb. 17.3–4) and Lund (Andersson 1989: 56) and on an unperforated example from nearby Bornais (Sharples 2004: fig. 5.13; forthcoming; Sharples and Parker Pearson 1999: fig. 8E).

The form and ornament of the elaborate expanded pin-head from Cille Pheadair therefore indicate a Scandinavian or Hiberno-Scandinavian origin. There are also Norse parallels for the simpler ring-and-dot ornamented expanded pin-head from Cille Pheadair (SF 2191; Figure 13.11), namely from Oslo (Grieg 1933: fig. 207) and Sconsburgh, Shetland (Wilson 1983: fig. 143). A paddle-shaped expanded pin-head with simple geometric ornament has also been recovered from Killegray Island, Harris (Richard Langhorne, pers. comm.)

Flat-headed pins

There are two flat-headed pins with notched sides from Cille Pheadair in phases 4 and 7 (SF 2178 from context 555; SF 1594 from context 209; Figures 13.11, 13.13), the latter decorated with dots. From Bornais there are two similar pins (Sharples and Parker Pearson 1999: fig. 8I, J), likewise decorated with dots and incised lines. A similar pin has been recovered from Tarbat, Ross-shire, and the splayed lateral top arms are paralleled by a pin from the Mackenzie collection (Close-Brooks and Maxwell 1974: fig. 3.1164) and a fragmentary pin-head from Brough Road, Birsay (Morris 1989: ill. 157: 294). A perforated pin with a similarly indented profile from Orkney is considered to be Norse (Foster 1989: fig. 27.612). The perforated series is more numerous and widespread, with examples with similarly indented profiles from Lincoln (Mann 1982: 11, fig. 6.51), Thetford (Rogerson and Dallas 1984: fig. 190.45) and Clifford Street, York (Waterman 1959: fig. 14.9), in addition to Scandinavian parallels (*ibid*.: 85, figs 2–3; Schwarz-Mackensen 1976: Abb. 12.6).

A bone pin (SF 2015, phase 4; Figure 13.12) with a transversely flattened head approximating to a square, decorated on each side with five dots, is paralleled by several plain, sub-rectangular pin-heads within the Cille Pheadair assemblage (including SF 1463 [phase 7], SF 1675 [phase 5] and SF 2174 [phase 1]). This particular form of pin-head has few parallels within Scotland, with only one such find dating from the Norse period from Jarlshof (Foster 1989: 85). The flat head of pin SF 2015 with its arrangement of dots is reminiscent of a series of bronze pins with ring-and-dot ornament from Whitby (Peers and Radford 1943: 63, figs 13–14) and York (Waterman 1959: fig. 11.1–4).

Thistle-headed pins

Thistle-headed pins are a Scottish peculiarity (MacGregor 1985: 120) and one (SF 1302/1051; Figure 13.12) was found at Cille Pheadair, in context 010 dating to the end of phase 5. The form was popular in the pre-Norse period, but long-headed examples like SF 1032/1051 are specifically Norse (Foster 1989: 55, 86–7), which corresponds with the length (96mm) of its reconstructed shank. There are parallel finds from Jarlshof (Hamilton 1956: 125, pl. XXIIc.2), Freswick (Curle 1939: 98, pl. XLVIII.10) and Pool (Smith 2007: ill. 8.8.9, PL1489, 1734, 1417).

Reel-headed pins

Reel-headed pins have Roman antecedents and a long history in Scotland. Similarly decorated examples to SF 1786 (phase 5; Figure 13.12), though with more subtle lower reels or collars and substantially shorter shanks, were recovered from the Pictish horizon at Birsay (Curle 1982: ills 7.19–21). A copper-alloy version comes from a Norse context at Freswick Links (Foster 1989: 76). A second possible reel-headed pin from Cille Pheadair (SF 1649,

also phase 5) has a combination of dots decorating the sides of the reel and a flat, circular top that are paralleled on a variety of small bone pins from the Pictish horizon at Birsay (Curle 1982: ills 7.19–22) and from Norse levels at Buckquoy (Ritchie 1977: figs 4.14–15), though most of those pins are ball-headed.

Place of manufacture

Although some of the pins conform to well-known types from Scandinavia and elsewhere, it is likely that most of the bone pins found at Cille Pheadair were manufactured locally. This suggestion is supported by the prevalence of unperforated flat rectangular-headed pins, including two with notched sides, forms which are rarely found elsewhere.

Catalogue

Phase 1

2116 context 580. Polished bone pin with slightly expanded simple flat-topped head, damaged to one side (L 60mm, W [head] 6mm). The groove on the back of this pin-head and upper shank identifies it as a skewer-type pin, probably made from a pig fibula (Figure 13.10).

2155 context 711. Bun-headed bone pin (L 80mm, D 6mm) with a roughly shaped flat-topped, circular head, the sides of which are rather randomly cut, with deeply undercut undersides forming the slender neck of the shank which subsequently swells (Figure 13.10).

2158 context 588. Highly polished fragment of a perforated pig fibula pin, with the lower portion of the flat expanded head broken across the perforation tapering into the shank which is of ovoid section (L 62mm, W [head] 12mm). The head of this pin is 2184, which conjoins 2158. The distinct groove of the distal portion of a pig's fibula is apparent on the back (Figure 13.10).

2159 context 715. Nail-headed bone pin with a linear crack across its flat-topped, circular head (L 101mm, D [head] 9mm). Clear delineation where chiselled underside of head joins the shank, which is of circular section with a clear swelling midway along its length (Figure 13.10). Nail-headed pins are found on many sites from the Roman period onwards and are known from Norse sites in Britain and Ireland (MacGregor 1985: 117–18). The length of this example suggests that it can also be dated to the Norse period.

2164 context 711. Fragmentary club-headed bone pin (L 41mm, W [head] 6mm). The pin is finely worked with a polished surface. The round-sectioned shank appears to have had a slight central swelling at the point of fracture (Figure 13.10).

2170 context 762. Lightly polished bone pin fragment with a small, transversely expanded flat-topped head approximating to a crutch (L 59mm, W [head] 9mm). The groove on the back of the head and neck suggests that this pin may be made from a pig fibula. The parallel-sided shank is slightly upturned, of ovoid section, and damaged on one face with tooling/wear apparent on the reverse (Figure 13.10).

2174 context 607. Transversely flattened-headed bone pin, broken in two (L 62mm, head 10mm × 5mm × 7mm high; D [shaft] 6mm). The head of this unusually short pin is crudely executed, displaying areas of cancellous bone. The shank is ovoid in section and lightly polished; its parallel sides begin tapering 25mm prior to the point (Figure 13.10).

2184 context 590. Flat, sub-triangular expanded bone pin-head broken at the perforation which would appear to have been near the base of the head (L 42mm, W [head] 19mm). The fragmentary pin-head is polished, with fine tool-marks apparent, and its clean finish suggests it might have been broken during manufacture (Figure 13.10). This conjoins with 2158.

Phase 2

2092 context 618. Polished perforated pig fibula pin (L 111mm, W [head] 16mm) with flat, sub-triangular expanded terminal with substantial perforation (D 6mm). Tooling is apparent on both faces of this pin. The shank is of ovoid section with an even taper (Figure 13.10).

2125 context 582. Shank of a probable bone pin from which the head and tip are missing (L 87mm, D 6mm). The shank is of approximately circular section with a distinctly bowed profile. It has a slight central swelling and tapers to a flattened section just prior to the missing point (Figure 13.10).

2126 context 582. Finely worked polished bone pin that expands into a four-sided faceted head with a flat square top (L 79mm, W [head] 5mm). From its square-sectioned neck, the shank tapers into a round section, before returning to a square section on a different orientation from its faceted head 25mm from the point (Figure 13.10).

2133 context 582. Lower portion of shank and point of a probable bone pin (L 58mm, D 6mm). The shank is of ovoid section and tapers gradually to a slightly angled point, which has transverse scratches from probable wear on one side (Figure 13.10).

2200 context 582. Worn and damaged perforated pig fibula pin with flat, expanded perforated head (L 94mm, W [head] 12mm). The head appears to have originally been of sub-triangular form, but damage has removed the two corners, giving a squared-off appearance. The shank is ovoid in section and broken at its lower end (Figure 13.10).

Phase 3

1526 context 319. Fragment of bone with an ill-defined flattened rectangular head, slight neck and tapering shank

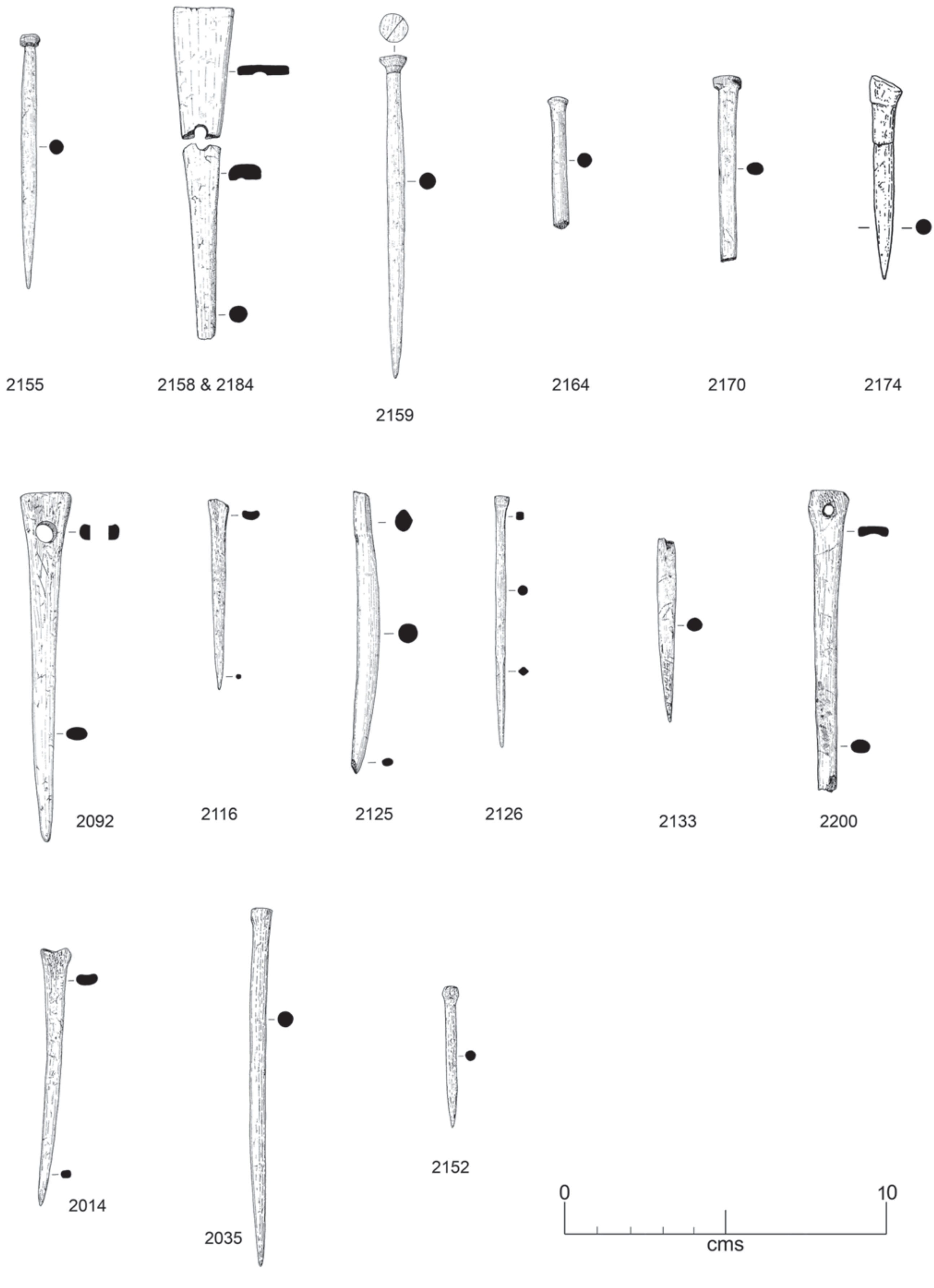

Figure 13.10. Bone pins from phases 1, 2 and 3

of sub-rectangular section with a broken lower terminal (L 93mm, W 9mm). It is possible that this very crudely worked bone was originally intended to be a pin with a transversely flattened rectangular head, and that its manufacture was abandoned after the break to its lower shank. Such pins are usually perforated but, at Cille Pheadair, there are several unperforated examples.

1717 context 528. Fragmentary perforated bone pin with a flat-topped, slightly expanded head (L 74mm, W [head] 10mm). The splayed head is of sub-rectangular section but tapers into a round-sectioned shank below the perforation. The lower portion of the shank is missing. Although the splayed head of this pin is quite modest, it probably belongs to the modified pig fibulae series (MacGregor 1985: 120–1). This series dating from the Iron Age was popular in the Viking/Norse and early medieval periods, in both the British Isles and Scandinavia. Although the narrow profile of this example's head could suggest that it functioned as a large needle, MacGregor argues that the lack of wear in the perforations of this series suggests that they functioned as dress pins (*ibid*.).

2014 context 319 (E 15.30; N 112.31; OD 7.07). Bone pin with expanded head with a central notch (L 81mm, W [head] 9mm). The evenly tapered shank is of sub-rectangular section and highly polished (Figure 13.10). The crutch-shaped head of this pin could possibly have resulted from the reworking of a damaged pin belonging to the perforated pig fibula class.

2035 context 425. Lightly polished bone pin with slightly expanded, simple flat-topped head (L 113mm, W [head] 7mm). The shank is ovoid in section with straight parallel sides prior to gradually tapering to its point (Figure 13.10).

2152 context 701. Small hipped bone pin with a flat-topped acorn head, clearly delineated from its shank, which is short and hipped 12mm from its point (L 47mm, D [head] 6mm; Figure 13.10). This pin belongs to the class of small hipped pins that were popular in Scotland from the seventh century onwards (MacGregor 1985: 117; Stevenson 1955: 285).

Phase 4

1117 context 317. Polished bone pin with slightly splayed, flat-topped head, one side of which reveals cancellous bone (L 73mm, D [head] 7mm, D [shank] 5mm). The simple head and shank are of circular section, with an even taper to the tip. There is a slight curve to the whole pin (Figure 13.11). The rather undiagnostic head of this pin identifies it with the expanded flat-topped series, which were relatively popular in the Norse period, with a close parallel, complete with splayed head of circular section, coming from Jarlshof (Hamilton 1956: 126, fig. 59.4.206) and an example with a less defined head from the Viking Age house at Drimore (MacLaren 1974: 17, no. 28). Another pin from Cille Pheadair (2035, phase 3), belonging to this series but with a substantially longer shank, confirms the Norse date for this rather undiagnostic head type.

1788 context 370 (sample square 6734). Lower portion of shank and point of a finely worked and polished probable bone pin (L 45mm, D 5mm). The tapering shank is of circular section.

1867 context 422. Nail-headed bone pin with an incised cross set within a circle decorating the upper surface of its flat head (L 70mm, D [head] 8mm). The shank swells just slightly below the neck but then tapers evenly to its point. The head and upper portion of the shank are polished and the pin is of fine workmanship. The incised cross set within a circle is unique, but a simple incised cross decorates the top of another nail-headed pin (1832) from phase 5.

1877 context 422. Bone pin with slightly splayed top with crudely rounded upper terminal, one face of which exhibits exposed cancellous material (L 79mm, W [head] 8mm). The shank is of circular section and has a slight swelling along its length; the point is missing. The pin appears to have been freshly worked and has no signs of polish or wear, suggesting that it might have been unfinished at the time of deposition.

1965 context 548. Flat, expanded bone pin-head of paddle-shape, with an indented articular terminal (L 64mm, W 14mm to >5mm). The perforation is set low in the head, and at this point the sides taper into a rectangular-sectioned shank, which is broken 20mm below the perforation. The head is decorated with a series of horizontal incisions, flanked by a pair of lines that rise from the top of the shank and each terminate in a dot set in the rounded lobes of the terminal (Figure 13.11). The paddle-shape of this expanded pin-head with its angled sides is paralleled by other large expanded pin-heads, one pronounced example being that from the Thames in the City of London (Wilson 1983: fig. 145a). Although decorated in the Ringerike style, the flat head of the Thames pin has a key pattern at its upper terminal and linear ornament at the junction with its shaft, such incised linear decoration being typical for this class of object as illustrated by examples from Hedeby and Lund respectively (Schwarz-Mackensen 1976: Abb. 14.1, 4). The punctuated terminals to the flanking lines are a feature of one of the expanded sub-triangular pin-heads from Bergen (Grieg 1933: fig. 209), and the marked indentation between these is an unusual feature also found on a closely related paddle-shaped pin-head from the island of Killegray in the Sound of Harris (Richard Langhorne pers. comm.).

1973 context 135. Fragment of a bone pin-shaft with broken expanded head (L 104mm, W 10mm). Unclear as to whether the head was perforated, but most likely given the pin's form. The shank is extremely irregular and twisted, but in general its section is sub-rectangular with a natural groove down one side. It ends abruptly in a sharply angled tip (Figure 13.11). If this pin was perforated, it most likely

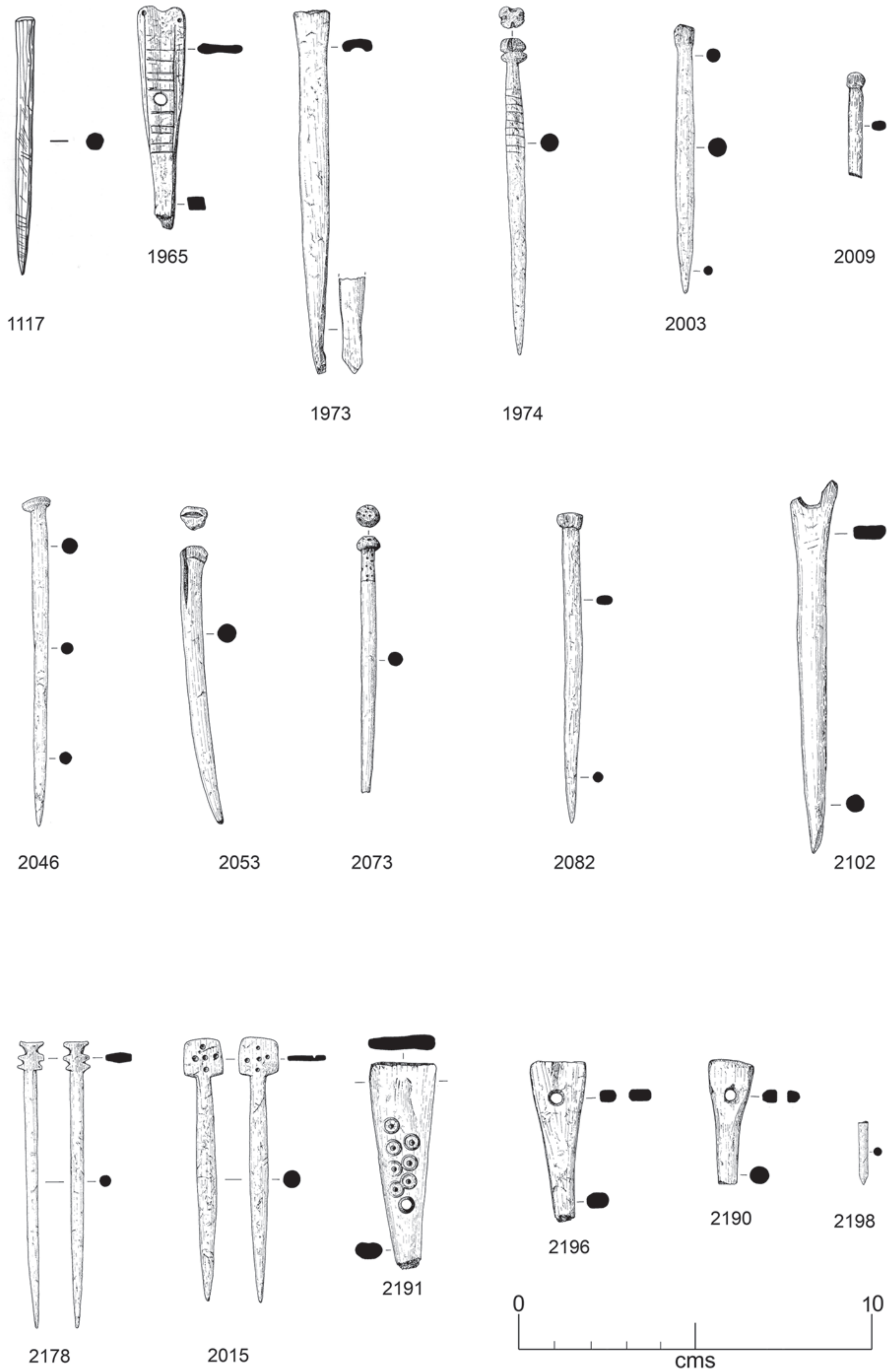

Figure 13.11. Bone pins from phase 4

functioned as a needle: its coarse shaft and tip would not have passed smoothly through cloth, but could have been used for loose weaves such as netting.

1974 context 504. Bone pin with 'astragaloid' grooved head, the plan of which has four incomplete radiating grooves, forming a Maltese cross (L 91mm, D [head] 8mm). These deeply incised grooves extend and slightly impose on a clearly defined collar. The shank is of circular section and expands from a slender neck into a swollen central hip, the upper part of which is incised with a transverse spiral of nine revolutions (Figure 13.11). The form of this pin-head with its astragaloid head and collar has its best parallels in metal stickpins, with copper-alloy examples of this class having been excavated from late twelfth- to early thirteenth-century contexts in Waterford (Scully 1997: 442, fig. 15.2.17). Bone parallels include an example from possible Late Iron Age levels of phase III at A'Cheardach Mhor, but the length and swollen hip of this example and another parallel from Cnip, Lewis (Foster 1989: fig. 13.328) suggest a Norse date is more likely. A similar groove-headed pin, but with a central protrusion, comes from Frobost (Parker Pearson 2012b: fig. 13.7.1) and another, with the grooves continuing through two additional collars beneath the head, is a stray find from the island of Killegray (Richard Langhorne pers. comm.).

2003 context 544. Polished bone pin with slightly expanded, flattened head approximating to a square, with an irregular, indented upper surface (L 77mm, W [head] 6mm). The shank is of round section with a swollen mid-portion (Figure 13.11). A fine parallel to this pin is 1033 (unstratified).

2009 context 504. Head and upper portion of shank of a small damaged bone pin (L 30mm, W [head] 5mm). The head expands from a slight neck into an irregular shape approximating to a square, of flattish section. The shank is of sub-rectangular section with rough indentations from possible wear down its length (Figure 13.11).

2015 context 504. Bone pin with transversely flattened head approximating to a square, which is decorated on both sides with five dots, arranged with one in the centre and the others at the cardinal points (L 77mm, W 11mm). The shank is of circular section with a clear swelling approximately half way along its length (Figure 13.11). Although paralleled at this site by two transversely flattened, plain, sub-rectangular pin-heads (1463, 1675), this form of pin-head has few parallels within Scotland.

2021 context 554. Tip of a bone pin.

2046 context 651. Club-headed bone pin with tapering round-sectioned shaft (L 94mm, W [head] 8mm). The club-head is set at a rather irregular angle relative to the shank. Both the head and the shank are irregularly worked despite the high polish on this pin. Fine diagonal striations are apparent on one side of the upper portion of the shank (Figure 13.11).

2053 context 569. Club-headed bone pin with slightly curved, tapering round-sectioned shank that is broken at its tip (L 80mm, W [head] 7mm). The head of the pin is crudely carved with a neck defined only on one side. The upper surface of the head has a substantial gash across it which is slightly offset from a cut to the side of the head extending into the upper portion of the shank (Figure 13.11).

2073 context 475. Flat-topped ball-headed bone pin, with dots decorating its head and the upper 10mm of its shank, which is delineated by a lightly incised margin (L 74mm, D [head] 6mm). Although the dots on the head appear randomly positioned, they have been vertically aligned on the upper portion of the shank. The shank is of round section and expands slightly from its decorated neck, eventually tapering to a now missing point (Figure 13.11). Similar decoration with dots decorating the head and delineated by a margin high on the shank is found on short pins from Cnip, Lewis and Galson, Lewis (Foster 1989: figs 24.268, 25.1162). A nail-headed bone pin from Jarlshof is decorated in a similar fashion (Hamilton 1956: fig. 69.5), with such elongated examples being regarded as Norse (Foster 1989: 78).

2082 context 569. Bone pin with expanded, transversely flattened head of irregular shape with a flat top (L 89mm, W [head] 7mm). The parallel-sided shank is of sub-rectangular section changing to a more rounded section where it begins to taper to a point (Figure 13.11).

2102 context 569. Fragmentary perforated pig fibula pin with flat, expanded head, broken across the perforation (L 104mm, W [head] 13mm). The shank is ovoid in section with a slight central swelling. The surface of the pin is extremely worn (Figure 13.11).

2178 context 555 (sample square 7345). Bone pin with transversely flattened head characterized by its indented sides creating two protrusions on either side, capped by splayed lateral top arms (L 82mm, W 7mm). The tapering shank is of circular section and broken at its tip (Figure 13.11). This transversely flattened head with notched sides is paralleled by another pin from Cille Pheadair (1594 in phase 7) although this example differs in only having a single notch in each side and is decorated with dots.

2190 context 504 (sample square 7205). Fragmentary perforated pig fibula pin with flat, expanded perforated head of sub-triangular form (L 36mm, W [head] 13mm). The surface of the pin is worn and the shank, which is of round section, is broken just below the neck (Figure 13.11).

2191 context 440. Flat, sub-triangular expanded bone pin-head broken at the neck (L 58mm, W 19mm to >7mm). The pin-head is perforated near the base of the head, above which it is ornamented with seven ring-and-dot motifs roughly aligned in two rows on one face, the reverse being undecorated (Figure 13.11). Although the shape of this

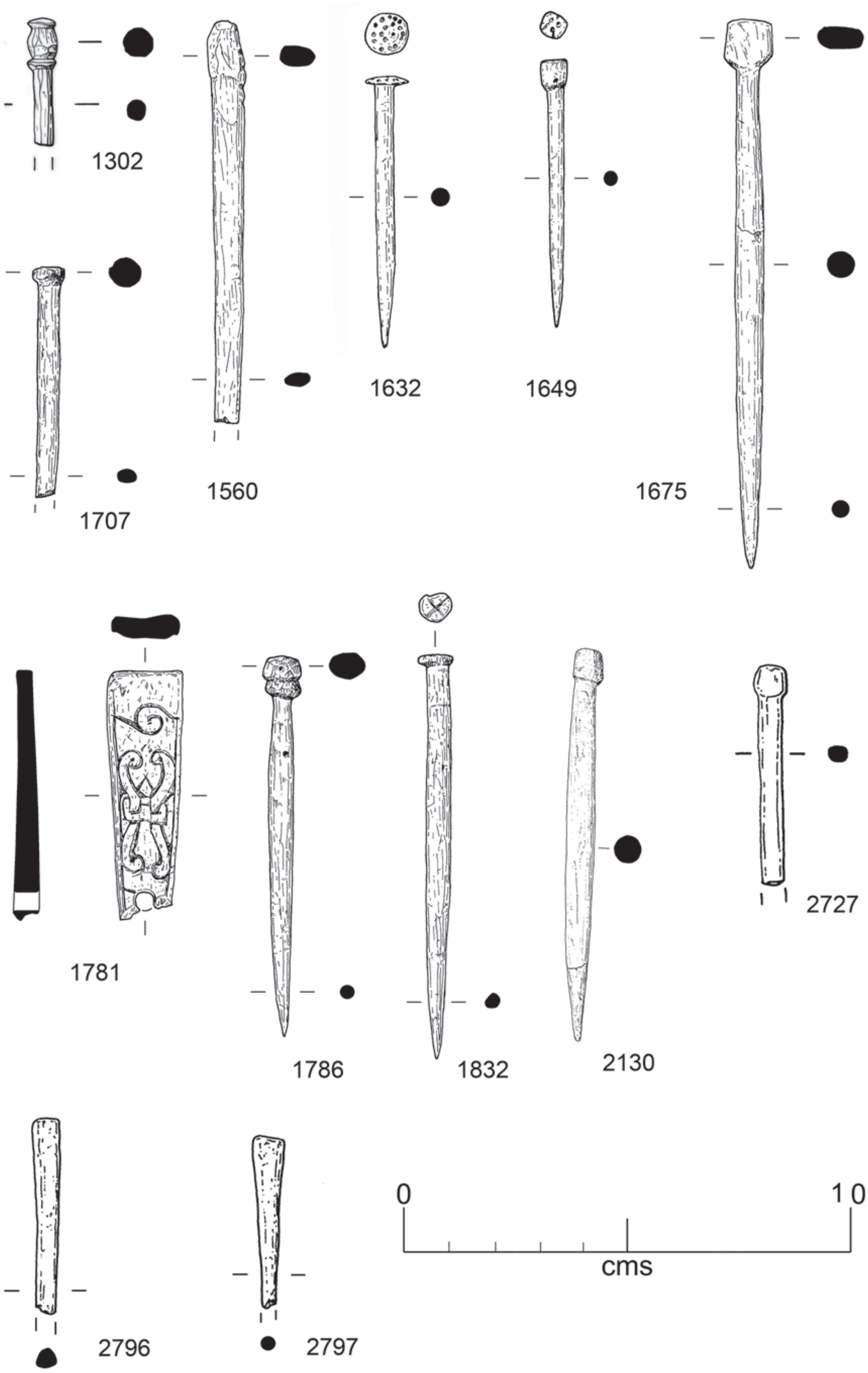

Figure 13.12. Bone pins from phase 5

pin-head was inspired by the pig fibula pins, the size of this example suggests that it might have been cut from a larger limb bone (MacGregor 1985: 9, 120).

2196 context 430. Fragmentary perforated pig fibula pin with flat, expanded perforated head of sub-triangular form (L 46mm, W [head] 16mm). The surface of the pin is worn and the shank, which is of sub-rectangular section, is broken just below the neck (Figure 13.11).

2198 context 554 (sample square 7317). Lower portion of shank and point of a probable bone pin (L 35mm, D 5mm). The shank is of circular section, with approximately parallel sides which taper sharply to a rather stubby point 5mm from the end (Figure 13.11).

2715 context 460. Incomplete shank of a bone pin (L 28mm, D 3mm).

Phase 5

1051 context 010. Finely worked polished bone pin-shank of round section, gradually tapering to a point (L 69mm, D 4.5mm). This shank fragment joins with the pin-head fragment 1302 from the same context to form a Norse thistle-headed pin 96mm in length.

1283 context 010. Finely worked lower portion of a bone pin-shank, broken close to the point. It is of round cross-section (L 40mm, D 4mm).

1302 context 010. Flat-topped, thistle-headed bone pin with a short length of shank (L 28mm, D [head] 7mm, D [shank] 4.5mm). The thistle-head has moulded collars above and below its elliptical central swelling. The rather irregularly carved baluster head is ovoid in section, whilst the shank is round and polished (Figure 13.12). This fragment joins with the lower shank fragment 1051 from the same context to form a complete pin with a total length of 96mm.

1410 context 351. Lower portion of shank and point of a probable bone pin (L 52mm, D 6mm). The fragment is finely worked. The shank is ovoid in section with parallel sides which only begin to taper *c.* 20mm prior to the point.

1522 context 351. Lower portion of shank and damaged tip of a probable bone pin (L 26mm, D 7mm). Much of the original polished surface is absent, but the pin would appear to have been ovoid in section.

1560 context 219. Head and upper shank of a simple bone pin (L 89mm, W [head] 8mm). The simple head is of flattened, sub-rectangular section and is roughly worked, with a slightly rounded top and exposed cancellous material to one side. The shank emerges from a slight indentation indicating the neck and is ovoid in section. It exhibits only a slight taper prior to its break (Figure 13.12).

1632 context 308. Dome-headed bone pin with numerous dots decorating its rounded cap (L 60mm, D [head] 9mm). Finely worked pin with an even taper to its shank which is of circular cross-section (Figure 13.12). Light polish with possible wear to its cap. Dots decorate the flat upper surfaces of nail-headed bone pins from Jarlshof (Hamilton 1956: fig. 69.5–7) and Drimore (MacLaren 1974: pl. 2.25), though not in such profusion.

1649 context 507. Reel-headed bone pin with three dots decorating its flat sub-circular top and four dots positioned irregularly around the lower margin of the reel, which is slightly concave-sided (L 59mm, D [head] 6mm). The shank is of circular cross-section and has an even taper. This finely worked pin has a polished surface (Figure 13.12).

1675 context 507. Lightly polished bone pin with expanded, flattened head, approximating to a square (L 123mm, W [head] 10mm). The shank is of circular section with a swelling midway along its length and appears to have a now-repaired break (Figure 13.12). This pin approximates to a series of pins with transversely flattened rectangular heads, most of which are perforated. The length of this pin would suggest that it is of Norse date. At Cille Pheadair there are several unperforated examples of this type, including 2015 in context 504 (phase 4), which is decorated with an arrangement of dots.

1707 context 313. Nail-headed bone pin with incomplete shank (L 51mm, D [head] 7mm, D [shaft] 5mm). Crudely worked and with no trace of any decorative details or a polished surface. The head of the pin is round in profile and narrows into a round, straight shaft which is broken. The surface of the shaft is slightly polished (Figure 13.12).

1774 context 313. Very worn bone pin with indeterminate head, though its upper profile is square with oblique corners (L 77mm, D [head] 7mm). The flattened upper portion of the shank tapers into a flattened ovoid section.

1781 context 534. Flat, expanded bone pin-head broken at the perforation, which is set low in the head (L 55mm, W [head] 17mm to >12mm). The upper terminal is slightly concave and one face of the tapering, sub-triangular head is engraved with a Ringerike-style union knot. This is characterized by inward-scrolling pairs of terminals that are centrally linked by a closed loop, with an additional triangular offshoot or lozenge-shape above. This is set within incised contours to the sides which are linked above by a single spiral. Traces of incised lines associated with the perforation suggest that the base of this ornamented face might also have been delineated. The reverse of the pin-head has traces of an incised margin down one side, broken by a strand of interlace with an incised triangle below, which appears to be an abandoned attempt to ornament this face (Figure 13.12).

1786 context 535. Bone pin with crudely carved double reel-head, the upper tier of which has two dots decorating

its sides (L 83.5mm, D [head] 8mm). Its shank is of circular section with a central swelling. Three dots decorate the shank 10mm below the neck. The pin is polished (Figure 13.12).

1832 context 522. Nail-headed bone pin with a cross incised in its flat sub-circular head (L 90mm, D [head] 8mm). A faint and incomplete incised line delineates a collar 9mm below the neck. The shank is of circular cross-section with a central swelling (Figure 13.12). The pin is lightly polished. The incised cross decorating the flat top of this nail-headed pin is unusual, though there is a close parallel also from Cille Pheadair (1867 in phase 4). Dots more commonly decorate the flat tops of nail-headed pins, as on examples from Tarbat, Ross-shire, Drimore (MacLaren 1974: pl. 2.25) and Jarlshof (Hamilton 1956: fig. 69.5–7). Simple incised crosses do decorate round-headed Pictish pins from Birsay (Curle 1982: ill. 7.14, 16), and this decorative device later became a standard type-division for metal stick-pin-heads from the eleventh century onwards.

1881 context 315. Lower portion of shank and point of a probable bone pin (L 55mm, D 5mm). The fragment is finely worked with a light polish. It is of round section and tapers evenly to a slightly angled point.

2130 context 308. Bone pin with transversely flattened head approximating to a square, which is damaged and worn (L 90mm, W [head] 6mm). The shank is of round section and has a swollen central portion (Figure 13.12).

2727 context 315. Upper end of a crudely made square-headed bone pin (L 51mm), with a sub-rectangular cross-section 5mm × 4mm (Figure 13.12).

2728 context 308. Incomplete shaft of a bone pin or point (L 25mm).

2741 context 351. Fragmentary perforated pig fibula pin (L 49mm, W [head] 10mm with sub-rectangular section 8mm × 4mm), broken across the perforation (D 4mm) in its flat, expanded head. The surface of the pin is polished and the shank is missing its tip.

2769 context 512 (sample square 6965). Proximal end of a bone artefact, possibly a sub-triangular expanded pin-head (L 20mm, W 19mm).

2790 context 503 (sample square 6960). Tip of a bone pin (L 17mm, D 4mm).

2796 context 010. Head and upper portion of shank of a bone pin with flat-topped head (L 42mm, D [head] 4mm–6mm, D [shank] 3mm–5mm). The simple head and shank are of oval section, with an even taper towards the tip.

2797 context 010. Head and upper portion of shank of a bone pin with slightly splayed, flat-topped head, one side of which reveals cancellous bone (L 37mm, D [head] 4mm–7mm, D [shank] 4mm). The simple head is of oval section and the shank is of circular section, with an even taper towards the tip. The rather undiagnostic head of this pin identifies it with the expanded flat-topped series.

Phase 6

1570 context 381. Lower portion of shank and tip of a possible bone pin (L 32mm, D 5mm). The tool-markings appear fresh and suggest that this fragment might have been broken during manufacture.

1615 context 403. Crudely worked bone pin with expanded, flattened head approximating very roughly to a square, but with a slight, possibly unintentional, indentation on one side (L 89mm, W [head] 10mm). The original surface appears to have had a light polish, but cancellous material dominates one face of the head. The shank is of sub-rectangular cross-section with a slight thickening towards its broken end (Figure 13.13). This is a crudely worked version of the series of pins with transversely flattened rectangular heads; in this case the surviving shank is also of rectangular cross-section.

1883 context 398. Crudely worked bone pin with expanded, flattened head approximating to a square (L 66mm, W [head] 11mm). Cancellous material is exposed on much of one face. Below the head the shank is of flattened sub-rectangular section prior to twisting into the semi-circular cross-section visible at the break; the point is missing (Figure 13.13). This is a crudely worked version of the series of pins with transversely flattened rectangular heads.

Phase 7

1456 context 214. Rather irregularly-shaped shank and point of a probable bone pin (L 58mm, D 6mm). The bone has been roughly worked and is damaged, but its irregular appearance could result from this being the flattened lower hip section of the shank. Its section is sub-rectangular.

1463 context 214. Bone pin with expanded, flattened head approximating to a rectangle, which is slightly concave on one side (L 105.5mm, W [head] 8mm). The shank is irregularly worked but tapers to a point and is of approximately circular section (Figure 13.13). Its surface is highly polished. The piece is a crudely worked version of the series of pins with transversely flattened rectangular heads. Such pins are usually perforated, but at Cille Pheadair there are several unperforated examples, with their lengths suggesting they are Norse.

1481 context 205. Lower portion of a bone pin-shank of circular section that was broken in antiquity. Its surface is polished through wear (L 49mm, D 5mm).

1512 context 204. Unperforated bone pin with simple rounded profile to the top (L 95mm W [head] 9mm). The tapering round-sectioned shank is broken in two places (one break having been repaired). Cancellous material is

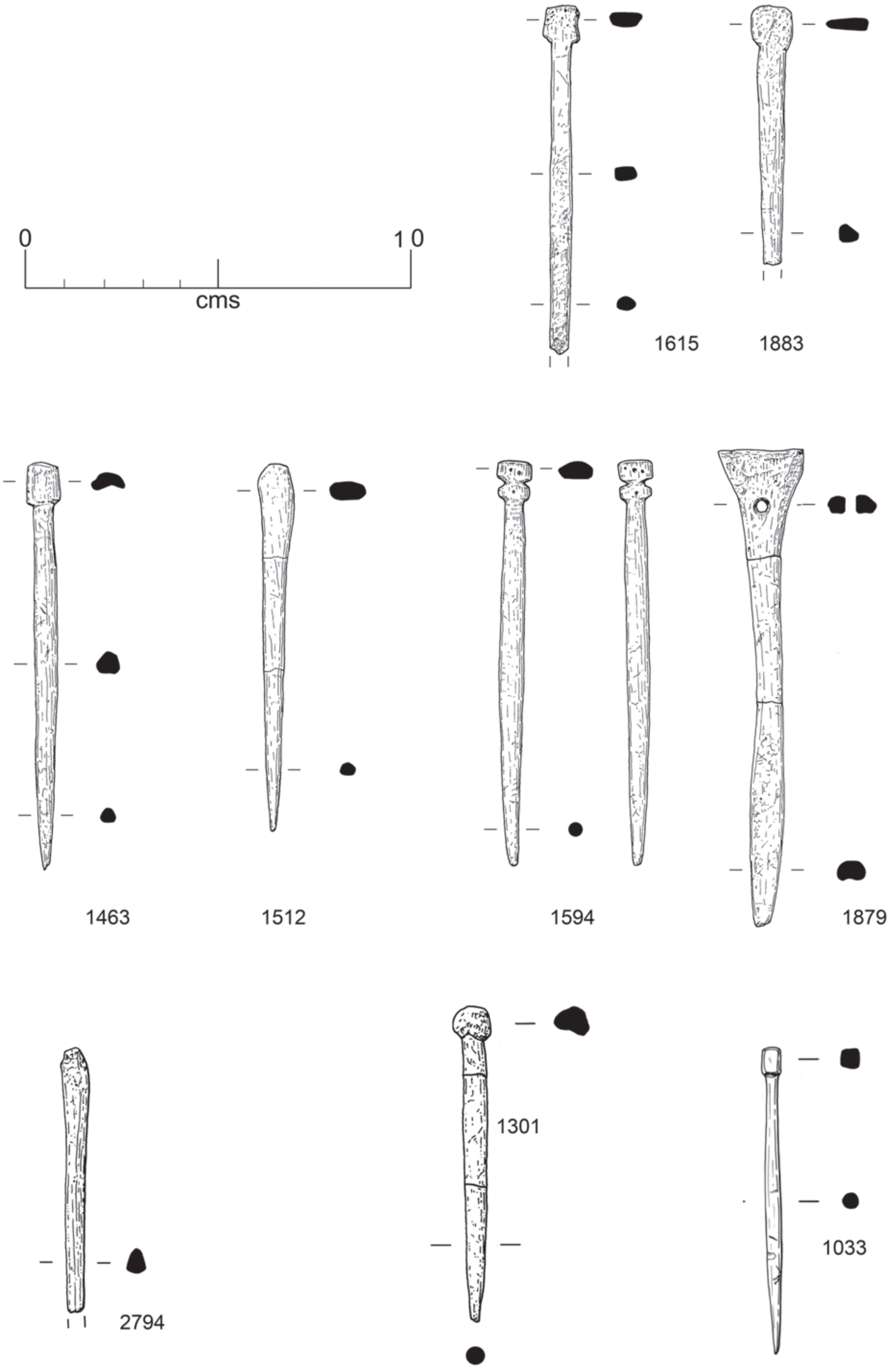

Figure 13.13. Bone pins from phases 6, 7, 9 and unstratified

exposed on one side of the pin and forms a flat back to the simple head (Figure 13.13).

1575 context 322. Lower portion of shank and point of a probable bone pin (L 51mm, D 6mm). The fragment has a light polish. The shank is ovoid in section and its parallel sides only begin tapering *c.* 10mm prior to the point.

1594 context 209. Bone pin with expanded, rectangular head indented with a notch in each side (L 104.5mm, W [head] 9mm). The upper field is decorated with three dots on one face and two on the other, whilst there is a single dot in the centre of the lower field on each face. The shank is of circular section and has a central swelling (Figure 13.13). The pin is highly polished. This expanded-head form with notched sides is paralleled at Cille Pheadair by 2178 (context 555, phase 4), though the latter has two notches on each side of the head and no dots. For comparative examples from other sites, see 'Flat-headed pins' above.

1879 context 116. Bone pin with large, expanded, sub-triangular perforated head and hipped shank (L 122mm, W [head] 22mm). The sub-triangular head is squared-off at the top, with much cancellous material exposed on one side. It tapers at the neck into a shank of sub-rectangular section which then changes to an almost circular section prior to splaying out into a flattened hip, of sub-rectangular section again, almost two-thirds of the way down the length of the shank (Figure 13.13). The pin is in three sections; the tip is abraded and broken. The surfaces of the piece display a low degree of polish and a brown coloration that may represent traces of a stain or paint. The hipped shank of this object confirms its identification as a dress pin. Its form, with the squared-off, sub-triangular head, identifies it with the modified pig fibulae series, with the length of this example placing it in the Norse period.

2476 context 033. Fragmentary bone pin with flat-topped, expanded perforated head of sub-triangular form (L 19mm, W 12mm–20mm). The head is broken through the perforation. One face of the head is entirely exposed cancellous material, as is the upper portion of the other side, possibly as a result of damage and wear. Where the original surface survives a crude cross (saltire) has been incised above the perforation but slightly to one side.

2479 context 322. Finely worked bone pin with a broken shank of rounded, sub-rectangular section which expands into an expanded head with a distinctive triangular apex and knob at the terminal (L 81mm, W [head] 14mm). The surface is polished from wear, particularly on the shank. A recessed triangle of cancellous bone is apparent just below the apex on the reverse of the pin, indicating it was made from a pig's fibula. This belongs to the group of expanded-headed pins made from pigs' fibulae, and in this case the articular end has been worked to form this distinctive and unusual apex, as most heads are either flat or slightly concave.

2791 context 206 (sample square 2791). Blackened tip of a bone pin or possibly a needle (L 7mm, D 2mm).

2794 context 327. Head and shaft of a crude bone pin of approximately oval section (L 68mm, D 5mm–6mm). Its head is slightly expanded and curved, terminating in a flat, angled top (Figure 13.13). Whittling marks are visible along the shaft.

Phase 9

1301 context 070 (sample square 6092). Bone pin, broken in three pieces but otherwise complete (L 80mm, D [head] 10mm, D [shaft] 7mm), with an irregular club-head and a round-sectioned shank expanding out of its neck with a slight central swelling before tapering to a point. The club-head is crudely worked, lopsided and undefined on one side due to the nature of the bone from which it was carved (Figure 13.13). This pin is a rather crude approximation to a ball-headed pin, a form that dates from the Roman period, but was common to the Picts, and experienced renewed popularity in the Viking period (MacGregor 1985: 117; Foster 1989: 77–8). It can be compared with a copper-alloy club-headed pin from Bornais Mound 3 (Clarke *et al*. 2005: 172, fig. 101). This classic type of Hiberno-Norse dress pin is common in Dublin, Waterford and Whithorn and can be dated typologically to the late twelfth–early thirteenth century (*ibid*.: 172). The phase 9 context in which the Cille Pheadair pin was found also dates to this period.

Unstratified (mostly from surface of phase 8)

1000. Lower portion of a tapering bone pin-shank with a slight kink, reminiscent of a hip, 38mm from its point (L 74mm, D 5.6mm × 4.5mm). The shank is of ovoid cross-section and is less polished above the kink than below, suggesting differential wear patterns, with the tip becoming polished most probably from fastening through clothing.

1033 context 001. Finely worked and polished rectangular-headed bone pin with a flat, square top. The shank is of round section with a swollen centre that tapers to a broken tip (L 79mm, D [head] 5mm, D [shank] 5mm; Figure 13.13). The rectangular head is paralleled on another pin of similar length from Cille Pheadair (2003, phase 4) and substantially longer pins from A'Cheardach Mhor (Young and Richardson 1960: 155.31) and Jarlshof (Hamilton 1956: fig. 59.1.194, 199). The swollen shank of this fine pin suggests that it is either Late Iron Age or Norse in date (Foster 1989: 72).

1285 context 001. Lower portion of a tapering bone pin-shank broken at its tip (L 38mm, D 4.5mm). The tapering shank is of ovoid cross-section, flattened on one side. Its surface is polished and displays signs of wear on its broader faces.

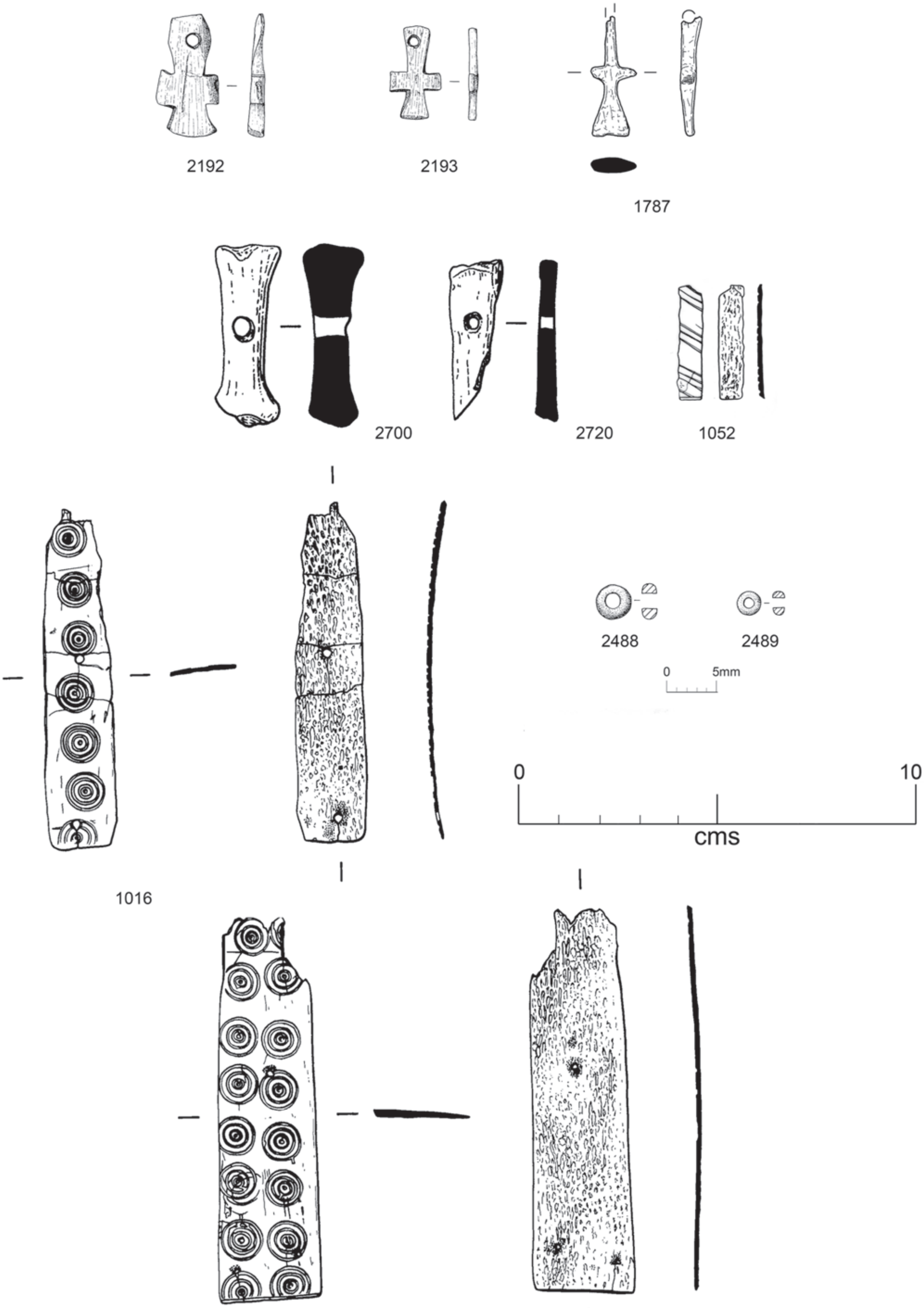

Figure 13.14. Bone ornaments and bone and metal beads

13.3 Cross pendants of bone

It is unclear what significance should be attached to the forms of the three cross pendants, the orientation of which was presumably determined by their pendant form. The extended upper arms of SF 2192 and SF 2193 could associate them with St Peter, just such an association having been made for a copper-alloy cross pendant with an expanded upper arm from Wetheringset cum Brockford, Suffolk (John Newman pers. comm.). Alternatively, these extensions could have been a purely practical means of accommodating perforations, as proposed for the cross pendant from the Goldsborough hoard, deposited *c*. AD 920 (Staecker 1999: 101). The manner in which the upper arm of the Goldsborough cross is perforated in section is mirrored by that of SF 1787, although the latter's expanded lower arm in a different plane is rather idiosyncratic though matched almost exactly by a pewter pendant from Whithorn (Nicholson and Hill in Hill 1997: 394, 10.78:3).

The wearing of devotional objects, including cross pendants, increased in popularity from the late tenth to the twelfth century, partly in response to Scandinavian contact (MacGregor 1985: 40). This is reflected in their predominantly Anglo-Scandinavian and Hiberno-Norse find locations which include York (Mainman and Rogers 2000: 2590, fig. 1284), Dublin (Wallace 2016: figs 8.18–19, 8.21, 8.40, 11.38) and Waterford (Hurley in Hurley *et al.* 1998: fig. 17.10.2). Cross-shaped pendants are found in pagan Norse as well as Christian contexts, urging caution in applying simplistic interpretations of Christian symbolism. The form clearly denotes some form of Christian association, however, and their manufacture in valued materials such as jet, amber and ivory suggests that they did function as devotional objects, Indeed, the rather stubby form of these crosses with occasional splayed arms is reminiscent of a series of jet cross pendants decorated with ring-and-dot, several of which come from twelfth-century ecclesiastical contexts (Pierce 2013: 199, 207)

Catalogue

Phase 4

2192 context 430. Cross pendant of bone (L 32mm, W 15mm). The side arms of this cross are approximately square-ended, though bevelled in section. The lower arm splays to a curved lower edge. The longer upper arm, which is perforated, expands and then tapers, with a much reduced depth, to an angled cut-off. The carving is relatively rough with visible tool-marks, though the piece has a polished finish with a clear upper face (Figures 13.14, 13.17). The cross form of this pendant is closely paralleled by an unperforated ivory cross 'blank' from Dublin (Wallace 2016: fig. 8.40).

2193 context 555 (sample square 7338). Cross pendant of bone (L 23.5mm, W 13mm). The horizontal side arms of this cross are square-ended, whilst the lower and upper arms splay, with the latter accommodating the perforation. This is a finely worked piece with a highly polished upper surface (Figures 13.14, 13.17).

Phase 7

1787 context 204 (sample square 6507). Cross pendant of bone (L 29mm, W [max] 9mm, Th 2.5mm) of unusual form. The side arms are of rather undiagnostic form, with the lower arm expanded, though tapering in section. Conversely, the upper arm, whilst narrow and straight when viewed from the front, expands in section to accommodate the perforation in a different plane. Below the arms the shaft appears to widen again and has broken across the line of the perforation, 4mm in diameter. The surfaces display a degree of polish (Figure 13.14).

13.4 Toggles

There are seven probable toggles from Cille Pheadair. The function of these perforated and modified bones, which are frequently found on late Anglo-Saxon, Viking/Norse and medieval sites, has long been debated (MacGregor 1985: 102–3). Traditionally they were identified as dress-fasteners, but more recently attention has focused on their capacity to make a humming noise when spun on twisted cord, hence the term 'buzz bones', supported by ethnographic parallels for this practice from Scandinavia and eastern Europe (MacGregor *et al*. 1999: 1981).

Whatever their function, 'toggles' have been recovered in small numbers from Norse contexts in Scotland, including the Brough of Birsay (Curle 1982: ill. 50.282), Freswick (Curle 1939: pl. XLVIII.11–14) and Jarlshof (Curle 1935: fig. 27); 11 examples came from Norse contexts at Pool, Sanday and 14 from Tuquoy, Westray (Smith 2007: 487). There are over 90 examples from Coppergate, York, with most coming from eleventh- and twelfth-century contexts (MacGregor *et al*. 1999: 1980–1) and 26 examples from Waterford (Hurley in Hurley *et al*. 1998: 674), with most of these dated to the twelfth and thirteenth centuries. The Cille Pheadair examples come from phases dated to the early eleventh and early twelfth centuries.

Catalogue

Phase 1

1839 context 608. Toggle made from a pig/sheep(?) metapodial perforated through its centre (L 57mm, D 19mm, D [perforation] 4mm).

Phase 2

2679 context 618. Unfinished toggle made from the first phalanx of a sheep/goat. One side is drilled (D 4mm) at its centre but the hole on the other side is unfinished.

Phase 3

2700 context 528. Toggle made from a sheep/goat right phalanx, drilled through its centre with a circular hole (D 8mm; Figure 13.14).

Phase 4

2720 context 430. Broken toggle made from a tapered piece of worked bone (L 38mm, W 6mm–12mm, Th 4mm) with a central hole (D 4mm) through its flat sides. This could alternatively be a small and rough version of a sub-triangular expanded pin-head (Figure 13.14).

Phase 5

1523 context 351. Toggle made from a perforated pig/sheep(?) metapodial (L 56mm, D 11mm [centre]–15mm), pierced at its centre with a hole (D 5mm). It is not otherwise obviously worked.

1688 context 315. Toggle made from a perforated pig/sheep(?) metapodial (L 45mm, D [centre] 12mm), one end of which has been pared down. The hole is off-centre (D 7mm). Signs of wear to one side of the perforation, whose diameter is unusually large. The rest of the bone appears to be unmodified.

2787 context 534. Rectangular toggle made from a partially modified vertebra, with two parallel holes drilled through the wall of the vertebra.

13.5 Decorated bone mounts

There are three decorated bone mounts from Cille Pheadair. On account of the correspondence between the diameters of the triple ring-and-dot on two of them (SF 1016 phase 5 and SF 1208 phase 7), it is likely that they are contemporary and have been incised with the same scribing tool, and were most probably intended to decorate the same object.

These bone strips were most probably riveted to a wooden box, the history of such ornamented boxes stretching from the Roman to the early medieval period (MacGregor 1985: 197–200). Hunter's 1993 survey of such bone mounts demonstrates a predominantly southern distribution, though numerous individual strips and three fragmentary box-lids have been recovered from York, including an almost complete example from Coppergate (MacGregor *et al*. 1999: 1954–5, fig. 913). Examples of such mounts from Scotland are rare, but include an unstratified find which is a close parallel to SF 1016 from Pool, Sanday (Smith 2007: ill. 8.8.22: PL0892), the Bu antler mounts (which are assigned a late Roman date and presumed to have been imported from the south; Hunter 1993: 328), a fragment from a late twelfth- or early thirteenth-century context in Perth (Bogdan and Wordsworth 1978: 27) and a stray-find from Galson, Lewis (Richard Langhorne pers. comm.).

The recovery of numerous comparable bone strips from Dublin, including an ornamented box-lid from Christchurch Place (Mann 1982: 41, no. 20) and comparable strips from twelfth- and thirteenth-century contexts in Waterford (Hurley in Hurley *et al*. 1998: 658), suggests that by the early medieval period such Scottish finds, if not native products, might have arrived via the Irish Sea. Contact with Dublin may also account for the distribution of comparable strips in Gamlebyen, Oslo (Wiberg in Høeg *et al*. 1977: 213, figs 38–40) and Lund (Blomqvist and Mårtensson 1963: 143, fig. 132), though these might have been produced under continental influence.

Another small bone mount fragment with diagonally incised lines (SF 1052, phase 5) might also have embellished a wooden object, such as a casket. Casket mounts decorated with linear ornament are known from York (MacGregor *et al*. 1999: figs 913, 915.7714, 8152), but diagonal incisions also decorate three antler mounts of a different nature (*ibid*.: fig. 912.7708, 7710–11). A fragment of bone mount likewise incised with diagonal lines, which cross each other to form a lozenge trellis, was recovered from a mid-twelfth century context at Waterford (Hurley in Hurley *et al*. 1998: fig. 17.3.22).

Phase 5

1016 context 023. The slightly curved form and the cancellous tissue on the rear of this thin strip (L 85mm, W 18mm, Th 1mm) indicate that it was probably made from a rib bone. It is decorated with a single irregular row of incised triple ring-and-dot motifs, the concentric diameters of which are 2.8mm, 6mm and 8.7mm respectively. The design was incised prior to the piece being cut, with an incomplete ring-and-dot motif at the surviving sawn end. The strip is damaged along one long side and at one end, but originally had a polished upper surface. Iron corrosion surrounds the two perforations along its length (Figure 13.14).

1052 context 010. A narrow, rectangular strip of polished bone (L 29mm, W 6mm, Th 1mm), with diagonally incised lines, possibly arranged in clusters of three or four. One of the narrow ends has a polished surface, indicating that this is an original terminal, whilst the other is broken along one of the diagonal incisions. Near the original terminal, corrosion stains indicate that iron rivets might have originally secured the plate to a base. The stains are alongside one of the long sides which appears to be a break, making the original plate broader. It is possible that this small mount fragment embellished a wooden object, such as a casket (Figure 13.14).

Phase 7

1208 context 200. The slightly curved form and cancellous tissue on the rear of this thin rectangular strip indicate that it is probably made from a rib bone (L 96mm, W 25mm, Th 1mm). It is decorated with two rows of incised triple ring-and-dot motifs, the concentric diameters of which are 2.8mm, 6mm and 8.7mm respectively. The roundels are irregularly spaced, with the outer pair of rings at the broken end touching. The roundels at the sawn end are incomplete, indicating that the design was incised prior to the piece being cut. The upper face was originally polished, but is now worn with a few scratches and is broken at one end, with a possible in-step along one edge just prior to

the break. Iron corrosion surrounds the four perforations, one of which is incomplete, being at the broken end of the plate (Figure 13.14).

13.6 Beads

Three beads were found at Cille Pheadair, one each of bone, glass and metal.

Phase 4

1508 context 358. Biconical, translucent, dark blue glass bead (H 7mm, D 11mm, D [perforation] 5mm). This is the only glass found at Cille Pheadair.

Phase 9

2488 context 029 (sample square 6022). Small ring-shaped bead of bone (D 4.5mm, D [perforation] 2mm; Figure 13.14).

2489 context 044 (sample square 6040). Tiny metal (silver?) bead (H 1mm, D 3mm, D [perforation] 1mm; Figure 13.14).

13.7 Gold fillet

Such fillets as the one from Cille Pheadair are identified as hair ornaments held in place by threads through the perforations. Indeed the coiling of this fragile object may result from its having been coiled around the wearer's hair. The fillet is incomplete and now in two fragments, and the perforations on the longer fragment may be secondary, as there is no perforated rounded terminal as known on parallel finds. Seven comparable gold bands have been recovered from Ireland (O'Floinn 1983: 6–7), and five from the west of Scotland, namely Bute and Iona (Glenn 2003: 90–1). These are dated to the eleventh and twelfth centuries and in several cases were associated with Scandinavian material, with the Scottish find spots also having ecclesiastical associations (*ibid*.: 90). The Cille Pheadair gold fillet came from a midden associated with a longhouse dating to the mid to late eleventh century.

Phase 3

1924 context 320. Two fragments of narrow gold fillet, coiled in antiquity (Ls *c.* 70mm and *c.* 180mm, W 3mm). The fillets are decorated with finely punched dots along their borders. Each strip has one terminal folded over. The longer strip has two perforations close to its other end, which is cut through the closest perforation. The shorter length is simply cut. The fragments do not join, but most probably originally belonged to a single strip (Figures 13.24, 13.25).

13.8 Silver ring

A finger-ring of silver was found at Cille Pheadair.

Phase 5

1686 context 517. Flat, banded, silver finger-ring (L 26mm, W 6.7mm), which is worn, corroded and squashed, with two breaks There is a small ovoid of applied decoration that now has a yellow patina (Figures 13.15, 13.18).

13.9 Copper-alloy stick pins

There are four copper-alloy stick pins from Cille Pheadair. Two are Hiberno-Norse examples (SFs 1868 and 2150), one is a frustum-headed pin (SF 1475), and the other (SF 2487) is the top of a club-headed pin.

Hiberno-Norse stick pins

The two Hiberno-Norse stick pins have close parallels both in Scotland and Ireland. Three round-headed copper-alloy pins with tripartite divisions have been recovered from Mound 2 at Bornais (Sharples 2000: fig. 7; 2004: fig. 5; forthcoming), though two of these are decorated with spirals rather than ring-and-dot motifs. Three round-headed copper-alloy pins were recovered from Whithorn, one of which has ring-and-dot motifs in its trilobate fields (Nicholson and Hill in Hill 1997: 365–6: 9–11, fig. 10.54.9–10).

Similar pins have been recovered in large numbers from Dublin, including a close parallel to SF 1868 from Winetavern Street which has a similarly flat underside to its hemispherical head (O'Rahilly 1973: fig. 20.E81.5626). Possible precursors to the ring-and-dot type, with tiny amber or glass settings, have also come from Dublin (Armstrong 1922: 73, fig. 1.10; O'Rahilly 1973: 12). According to Nicholson and Hill (in Hill 1997: 365), the Scottish stick pins of this type either derive from or are associated with the Dublin types, which come from contexts dating from the beginning of the twelfth century into the thirteenth century (O'Rahilly 1973: 68, fig. E). The two pins of this type from Cille Pheadair are earlier: one came from the fill of a pit dating to the eleventh century (the precise dating within that century is uncertain; see Chapter 3), and the other from the floor of House 700, the first longhouse, securely dated to the mid to late eleventh century.

Frustum-headed pins

Frustum-headed pins form a rather select group of long stick pins. The Scottish provenances are predominantly in the Western Isles (Foster 1989: 96), with outlying examples from Loch Boralie, Sutherland (Batey 1992: 353, ill. 1), Dornoch, Sutherland (Inverness Museum), Urquhart Castle (Samson 1982: 473, fig. 6.78; Batey 1992) and Perth (Ford 1987: 123, ill. 60, 124.13).

Controversy surrounds the dating of this form of pin-head, with Laing suggesting an eighth–ninth century date (1975: 328–9), whilst Batey's review of the series in the light of the more recent find from Urquhart Castle places the type in the thirteenth–fourteenth centuries (1992: 351).

The only frustum-headed pins to have been excavated from stratified contexts in Scotland, in addition to the Cille Pheadair example (SF 1475), are from Bornais (Sharples 2000: fig. 7; forthcoming) and the Perth example, which has been dated to the fourteenth–fifteenth centuries (Ford 1987: 123). The Cille Pheadair pin came from a midden associated with the rebuilding of House 500 in the early twelfth century.

In terms of its ornament, the vertical ribbing on the frustum head of SF 1475 most closely parallels that on a related pin-head that formed part of the MacKenzie Collection, suggesting that it might have come from the vicinity of North Uist (Close-Brooks and Maxwell 1974: 288, fig. 2.977). That pin, like the Cille Pheadair example, has simple incised decoration on the upper portion of its shank, comprising short incised diagonals in this instance. The shank of the Bornais pin is hexagonal in section, with each face decorated with a vertical chevron. Simpler ornamentation, more akin to that found on SF 1475, is found on the upper shanks of two stick pins with diminutive frustum or square spatulate heads from Waterford, which were excavated from twelfth-century contexts (Scully in Hurley *et al*. 1998: 440–2, fig. 15.1.16–17).

Related square spatulate-headed pins have been excavated from late twelfth- and thirteenth-century contexts in Dublin, including a cluster of five from Christchurch Place (O'Rahilly 1973: 79, fn. 80), though it should be noted that the Irish examples are considerably smaller than the Cille Pheadair example and its closest parallels.

Club-headed stick pins

Club-headed stick pins, similar to SF 2487 but with different head types, have been recovered from Bornais Mound 3 (Sharples 2000: fig. 7; 2004: fig. 5; 2005: 172, figs 56, 101) and Whithorn (Nicholson and Hill in Hill 1997: 368: 32–42; fig. 10.54.32–42). Although earlier forms of the club-headed class of stick pin have been recovered from sites such as Lagore (Hencken 1950: fig.16.1254), their *floruit* in Dublin was from the last quarter of the eleventh century into the thirteenth century (O'Rahilly 1973: 58). The Cille Pheadair example is from a phase of activity dating to the later eleventh century.

Phase 1

1868 context 605. Round-headed copper-alloy stick pin (L 69.6mm, D [head] 4.5mm, D [shank] 3.2mm) with type 1 division of its hemispherical head (O'Rahilly 1973: fig. C). Its tripartite head has a ring-and-dot in each lobe. The neck is plain, and the round-sectioned, expanding shank has a slight kink *c.* 1/3 of the way down its length prior to tapering to a point. The pin is corroded and the upper portion of the head is worn (Figure 13.15).

Phase 3

2150 context 701. Round-headed copper-alloy stick pin (L 82mm, D [head] 5mm, D [shank] 3.2mm) with type 3 division of its head (O'Rahilly 1973: fig. C). Its tripartite head divisions extend to the shank, with a ring-and-dot decorating each lobe. The neck is plain, and the round-sectioned shank expands in the upper third of its length prior to tapering to a point. The pin is corroded (Figure 13.15).

Phase 5

1475 context 010. Copper-alloy pin, with vertical grooves on all four faces of its frustum head and a plain rectangular top (L 105mm, W [head] 7mm x Th 5mm, D [shank] 3.7mm). A transversely-nicked collar or abacus separates this head from the round-sectioned shank, the upper portion of which is decorated with haphazardly incised, short diagonal lines, approximating to three crosses, below both narrow faces of the frustum. The tapering shank diverts off at an angle *c.* 1/3 of the way down its length (Figures 13.15, 13.20).

Phase 8

2487 context 004 (sample square 6003). Head and neck fragment of a club-headed copper-alloy stick pin (L 7.5mm, D [head] 5mm, D [shank] 3mm). The head is of circular plan, with four incomplete radiating grooves forming a Maltese cross, the divisions extending to the shank with four irregular grooves (Figure 13.15).

13.10 Annular brooch of copper alloy

The annular form of this brooch with its two raised collets is typical for the thirteenth century. However, it was retrieved from a midden layer associated with House 312, dating to the mid-twelfth century, and the settlement at Cille Pheadair was entirely abandoned by the mid-thirteenth century.

The closest parallel to this brooch is a corroded copper-alloy metal-detector find from Ixworth Thorpe, Suffolk (IXT011; John Newman pers. comm.). The form and dimensions of these two brooches are so close as to suggest that they share a common model. This also applies to a slightly smaller brooch recovered from the early medieval site at Kaldbak, Streymoy, the Faroes (Arge 1980: 31–back page). A closely related, though smaller, brooch has a Kentish provenance (Hattatt 1987: fig. 108.1341), and a further related brooch, but lacking collets, has been recovered from Canterbury (Frere and Stowe 1983: fig. 61.2). Many contemporary annular brooches have multiple collets, but examples from London (Egan and Pritchard 1991: fig. 160.1309) and Winchester (Biddle 1990: fig. 172.2025) likewise have only two raised collets set equidistantly to either side of the pin. These are humble copper-alloy copies of Cherry's class 6b brooches that date to the thirteenth and fourteenth centuries (1988: 21–3). A fragmentary example belonging to this class from Perth (Ford 1987: 123, fig. 59.1) comes from an early to mid-fourteenth century context.

Phase 7

1453 context 009. Cast copper-alloy annular brooch with a slightly sub-circular frame (D 31mm, Th [frame] 6mm,

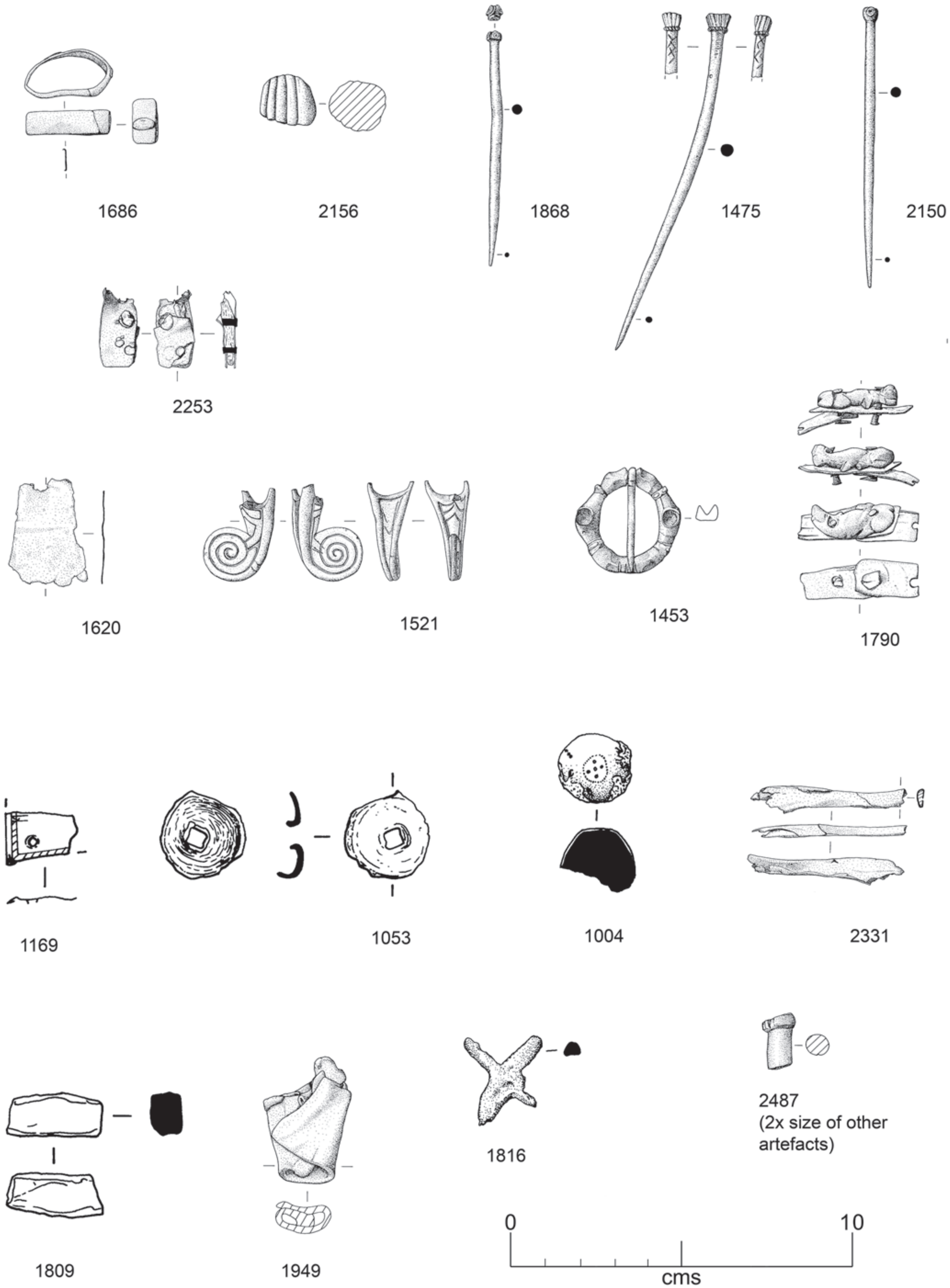

Figure 13.15. Non-ferrous ornaments

H [collet] 5mm). The front face is decorated with two opposing raised circular collets, now empty, but probably originally set with glass. The collets sit high on the hoop, from which they rise with a gentle taper, and splay slightly outwith the annular frame. Stylised animal heads with squared-off snouts and sunken cheeks are positioned to either side of the pin constriction, and are mirrored by a similar, though less prominent, pair to either side of the pin-rest, which has three vertical indentations. Collars separate the animal heads from the collets. The pin has a plano-convex cross-section and a simple loop with a pair of transverse incisions at its base (Figures 13.15, 13.22).

13.11 Spiral terminal of copper alloy

This terminal (SF 1521) is of extremely sophisticated design and craftsmanship. Although the main motif of a spiral is not particularly diagnostic, the crossing or break of its outer revolution by an intrusive band is a feature of both the Mammen and Ringerike styles (Fuglesang 1980: 14). A Ringerike-style bone cylinder, which arguably also displays some Mammen characteristics, was recovered from Bornais (Sharples 2004: 265, 269, fig. 8). These stylistic characteristics would suggest a date in the late tenth/early eleventh centuries together with Scandinavian influence, though the traces of tinning indicate its likely manufacture in the West. The terminal was retrieved from the hearth of House 312, which dates to the first half of the twelfth century.

Although SF 1521 displays no zoomorphic characteristics, its robust three-dimensional qualities are paralleled by the free-standing beasts that appear on a series of Ringerike-style vanes from Scandinavia (Fuglesang 1980: pl. 23B). These stylized beasts have prominent spiral joints, the outer revolution of that from Söderala, Sweden (*ibid*.: pl. 23A) being crossed or broken, and the bronze horse associated with this series (*ibid*.: pl. 23B) having repeating incised curves on its legs, not unlike the chevrons emanating from the Cille Pheadair spiral. Tiered chevrons likewise emanate from paired spirals at the base of a Ringerike-style bone pin from the River Thames (*ibid*.: pl. 61E)

The function of this unusual artefact is uncertain, though it appears to have been a terminal. It has been suggested this could have been for a drinking horn (Parker Pearson *et al*. 2004b: 250), though its three attachment prongs would not provide the same support or closure as standard, socketed drinking-horn terminals (Petersen 1940: 169–72). It could also have formed a finial of some description, with its crozier-like appearance possibly indicating that the item had religious significance. However, again the link is tenuous as crozier heads have round-socketed attachments.

Phase 7

1521 context 205. Fine cast copper-alloy terminal with traces of tinning in its recessed grooves (L 30mm, W [spiral] 18mm, W [between extensions] 14mm). It comprises a flat circular form with a trilobate extension. The circular terminal is decorated on both faces with a coiled spiral which turns through three revolutions, becoming the external border, bifurcating and expanding into linked pronged extensions creating a sub-triangular recessed field between. There are random incised lines at this base of the recess, possibly keying for a setting or sheet-metal inlay of which nothing now survives. A third pronged extension, now broken, forms the apex outline to three incised chevrons of diminishing size. The lowest chevron arms extend and overlie, or cross, the outer revolution of the spirals on both sides of the terminal (Figures 13.15, 13.21).

13.12 Animal mount of copper alloy

This small animal figure (SF 1790), cast in copper alloy, is unusual in its naturalistic appearance and was probably intended to portray a lion or feline of some description. It is quite unlike the heavily stylized zoomorphic creatures of contemporary Scandinavian and insular art, and may come from the Carolingian empire, where there was a revival in classical naturalism. Although not as naturalistic, small crouching lions adorn the ridges of the late ninth-century Enger and Burse reliquaries (Lasko 1972: pls 7–8, 53–4). It is even possible that this creature dates back to classical antiquity.

The irregular strips to which the animal is riveted are probably not as exotic and indicate that the mount was attached to organic material of *c.* 4mm in thickness. This is likely to have been leather on account of close similarities with SF 2253, fragments of riveted copper-alloy strips with leather sandwiched between (see section 13.14 below), which could have belonged to the same object as SF 1790.

Phase 8

1790 context 108 (sample square 6756). Three-dimensional cast copper-alloy quadruped, riveted to two interconnected copper-alloy strips (L [total] 35mm, [animal] 24mm, [strips] 30mm, 18mm; W [animal] 10mm, [strips] 8–11mm). Although worn, the animal is naturalistic in appearance, with its neck arched to one side and jaws wide open. It has a sinuous body, but its lower limbs appear to be missing, though its haunches suggest that it was crouching. It is riveted by two studs to a thin strip of copper-alloy through its neck and hindquarters, with the latter rivet also passing through a second strip which swivels freely and was most probably aligned beneath the upper strip, as the distance between its perforations (10mm) matches that above. The ends of both strips are cut, through the lower strip has been cut through a perforation (Figures 13.15, 13.23).

13.13 Spherical weight of copper alloy and iron

This truncated spherical weight (SF 1004) belongs to one of the most common types of Viking-Age weight, with

the copper-alloy mantle providing a safeguard against the weight being tampered with. The origin of these weights is thought to derive from the Arabic world, coming to Scandinavia with Arabic coins (Steuer 1997: 46). Some examples bear Arabic or imitation Arabic scripts on their poles, and there is now evidence for the manufacture of the type at Birka, Sigtuna and Hedeby (Gustin 1997: 171–2). On account of SF 1004's corroded and damaged condition, little can be said about its metrology, though the five inscribed circles are almost certainly weight-markings, and the presence of such a weight is suggestive of a weight-based (bullion) economy having been in operation.

The Cille Pheadair example, with its relatively small poles inscribed with five unconnected circles set within a single circular margin, identifies it as probably belonging to Steuer's sub-group B2 (1997: 47–8, Abb. 15). There is however a slight possibility that the weight belongs to Steuer's B3 group on account of a possible medial ridge just visible along one damaged edge of the copper-alloy mantle, but this could be a distortion caused by damage and corrosion.

B2 weights first appeared in the southern Baltic around AD 1000 and spread northwards into the Baltic area and beyond during the eleventh century (Steuer 1997: Abb. 18), continuing to be deposited until the late twelfth and early thirteenth centuries (*ibid*.: 48–50, 305). The majority of B3 weights are solid copper-alloy single finds from Gotland (*ibid*.: 305–6), and the type appears to have been most popular during the eleventh and twelfth centuries (*ibid*.: 308–9). The Cille Pheadair weight came from a midden associated with the second stage of House 500, dating to the early twelfth century.

There is only one other recorded example of a truncated spherical weight from Scotland. This was excavated from a coastal midden in the Bay of Cleat, Westray, Orkney in 1997 (Maleszka 2003: 283), and is unusual in that it is of the solid copper-alloy variety. Both weights probably derived from the Scandinavian Baltic during the late Viking Age. Several examples of the more common type with an iron core have been recovered from England, including at least half a dozen from London (Kruse 1992: 80), five examples from York (Mainman and Rogers 2000: 2564), and several examples from Norfolk (Margeson 1996: 56), with recent metal-detector finds (Susan Kruse pers. comm.) showing the type to have been more widespread than originally thought.

A cuboid lead object from a phase 2 context (SF 1809) may also be a weight (see section 13.15 below).

Phase 5

1004 context 010 (14.35E, 114.15N). Damaged and heavily corroded truncated spherical weight with an iron core and copper-alloy mantle (H 16mm, D 21mm, currently weighing 22.0g). Approximately half of the weight is missing, but one of the two flat poles survived at the time of cataloguing and was inscribed with a circle of small indentations within which are five small circles configured as on a die. Active iron corrosion has now obscured these details (Figure 13.15).

13.14 Miscellaneous copper-alloy artefacts

There are nine miscellaneous items of copper alloy, or copper alloy and iron, from Cille Pheadair, together with two copper-stained bones (though no copper-alloy artefacts were found in their vicinity).

Phase 1

1146 context 323. Incomplete pierced iron fitting made from a tapered plate (L 59mm, W 19mm–7mm, Th 4mm) ending in a circle (D 17mm). The plate has broken at its centre where it was cut by a large, presumably circular hole (D 12mm). The circular end has a small patch of copper-alloy inlay, forming a lattice pattern (see Figure 15.3). This iron artefact is presumably a mount for a wooden box or chest. It is matched by SF 2466 (in phase 5), which is the same shape and has all of its lattice decoration surviving. The two fragments may have formed a fitting 102mm long with a central circular hole (D 14mm). This artefact is also listed in the iron artefacts catalogue in Chapter 15.

2156 context 709. Fragment of unidentified cast copper alloy (H 15mm, W 16mm × 13mm). The object has a worn flat base and cast ridges of varying width on three faces, one of which has transverse indentations giving it a rope-like appearance. The ancient break reveals a slight hollow on the inside of the casting. Although unidentified, this could have been a 'footing' for a larger cast object (Figures 13.15, 13.19).

2331 context 590. Fragment of sheet copper alloy that appears to encase some organic material, though it might originally have formed an irregular hollow tube of rectangular cross-section, which splays towards both fragmented ends (L 46mm, W 4–8mm, Th 4mm). The long edges appear to butt together at one corner with a slight overlap. The function of this folded strip is unclear, although it could be a tag or strap-end that encased and protected an organic strap of some description (Figure 13.15).

Phase 4

2188 context 504. Fragment of cut whale bone with copper-alloy staining on its outer face (L 43mm, W 16mm) (see Figure 14.9; also listed in the catalogue of worked cetacean bone in Chapter 14).

2253 context 504. Corroded and fragmentary sub-rectangular copper-alloy plates riveted together with two copper-alloy rivets, sandwiching a leather strap between (L 23mm, W 11mm, Th 4mm). It is unclear whether this object is a binding strip or tag (Figure 13.15). Its width corresponds closely with that beneath the copper-alloy animal figure SF 1790.

2678 context 555 (sample square 7382). Copper-alloy stain on a fragment of bone.

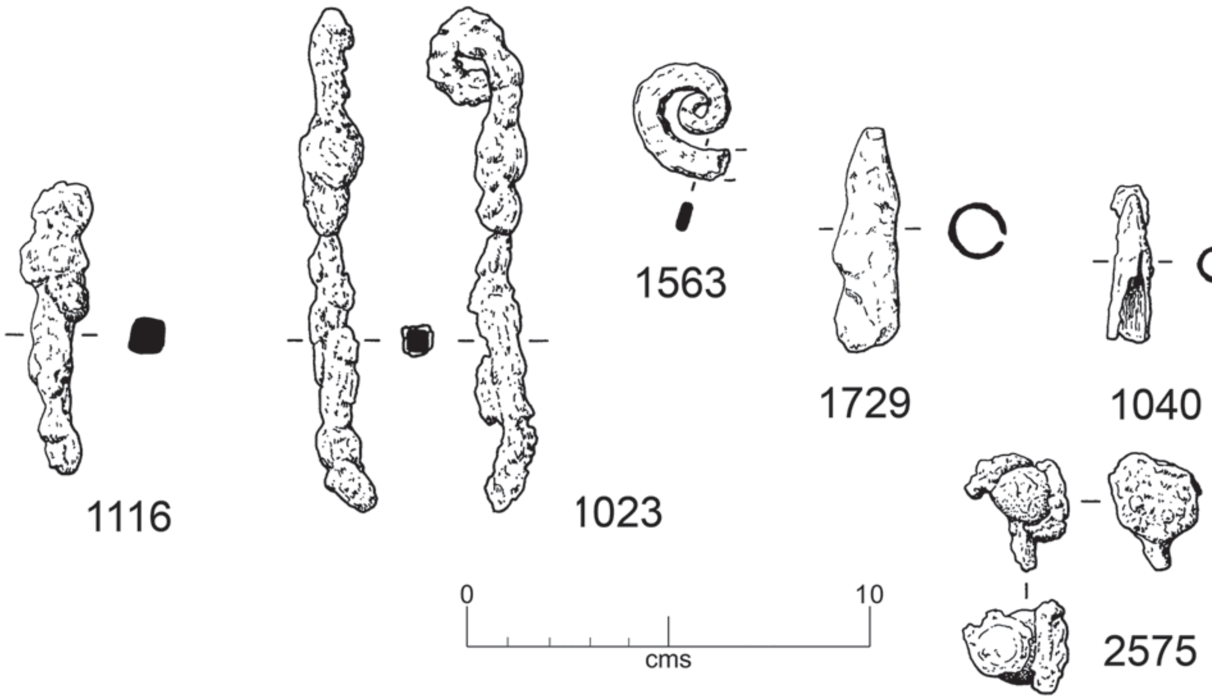

Figure 13.16. Iron ornaments

Phase 5

1620 context 010. Thin, tapering fragment of sheet copper alloy (L 32mm, W 16–23mm). It is damaged at both narrow ends where there might originally have been perforations for attachment rivets. The narrower end appears to preserve part of the original edge. There is a distinct depression transversely crossing the fragment, which is slightly undulating over its surface. This was most probably a fitting or plate of some description (Figure 13.15).

2466 context 313. Incomplete tapering iron strip (L 48mm, W 19mm–8mm, Th 12mm) with a roundel at one end. It is decorated with an elaborate copper-alloy inlay of latticed lines across its entire surface. This is possibly half of a chest fitting. It is matched by SF 1146 (in phase 1), which is the same shape and has only a small portion of the lattice decoration surviving. The two fragments might have formed a fitting 102mm long with a central circular hole (D 14mm). This artefact is also listed in the iron artefacts catalogue in Chapter 15.

Phase 7

1169 context 329. Decorated and perforated tapering sheet copper-alloy plate (L 20mm, W 10–14.5mm). The broad end is folded over. One long edge has a finely incised border with diagonal hatchings that continues in a contoured band along the fold until a cut edge. This edge appears to be a secondary cut as it cuts right through the ornament on the fold, in which the direction of diagonal hatchings had just changed. The perforation was clearly impressed with a point/awl from the upper surface. This fragment of finely decorated sheet metal plate appears to have been cut in antiquity, possibly approximately bisecting the sheet if one assumes that the hatchings changed direction midway. Its function is unknown (Figure 13.15).

2541 context 209. Iron clench nail (L 20mm) with a circular head D 13mm and a square rove (28mm × 28mm) clasping a folded-over copper-alloy strip (Th 3mm), on the fold of which is a small hole (D 2mm), possibly for suspension. Shank has a circular cross-section. There was an organic material (Th 6mm; possibly leather – there are no wood grain impressions) held between the folded copper alloy (thereby making a distance of 12mm between nail-head and rove). This is presumably a rim or binding which has been riveted for extra strength (see Figure 15.4). This artefact is also listed in the iron artefacts catalogue in Chapter 15.

Phase 8

1053 context 051 (9.26E, 106.20N, 6.71OD). An incomplete copper-alloy disc (D 25mm) with a central circular hole (D 4mm), 1mm thick but concave to a depth of 5mm (like a modern bottle-top) as if to cover the cylindrical end of a handle (Figure 13.15).

13.15 Lead artefacts

Four lead objects were found at Cille Pheadair: a bar that was probably a weight (SF 1809), a cross-shaped object (SF 1816), a clench nail (SF 2270) and a folded strip (SF 1949). The only other piece of lead from the site was found applied to the back of a decorated but broken bone artefact thought to be part of a comb case (SF 1503, phase 5).

If SF 1809 is a weight, then its simple truncated cuboid form is unusual, and it is possible that it represents a measured quantity of lead (Owen in Owen and Dalland 1999: 120) waiting to be fashioned (hammered) or cast into a weight of more standard form. Failing that, it could simply be an indeterminate lump of lead, which by mere chance happens to approximate in weight to the standard of the period. There are remarkably few Viking-Age lead weights from Scotland, as discussed in relation to the two unstratified weights associated with the Scar burial (Owen in Owen and Dalland 1999: 125; see also section 13.13 above). As in Norway (Pedersen 2007: 121), weights from grave contexts are very different from those recovered from settlement sites, where those of lead predominate, as seen at Whithorn (Nicholson and Hill in Hill 1997: 392).

Phase 1

1816 context 323. Irregular cross-shaped object with two of the arms broader than their counterparts, one of which is narrow and broken (L 30mm x 28mm). The object is smooth on one face and pitted on the other, indicating that it may be an incomplete casting. The object is unlikely to be a devotional object, with one arm considerably thicker than its counterpart, and most probably represents waste. However, rather crude lead cross pendants are known from elsewhere (Redknap 2004: fig. 13f), including nearby Bornais (Sharples *et al*. 2016: fig. 17.4:15) and this remains a possible interpretation (Figure 13.15).

Phase 2

1809 context 600. A roughly fashioned lead bar, truncated by cuts at either end where the edges are slightly bevelled (L 27mm, W 11mm × 11mm, Wt 26.421g). This simple lead cuboid (Figure 13.15) is probably a weight, or the raw material for a weight, on account of its close adherence to the one-øre unit (26.65g) of the early Viking Age (Brogger 1921: 102), which corresponds very closely with the tenth/eleventh-century Dublin unit of 26.6g (Wallace 1987).

1949 context 600. Folded lead strip (L 34mm, W 25mm). The original width of the strip was *c.* 25mm. Although its original function is unknown, this strip was probably folded as waste for recycling (Figure 13.15).

Phase 4

2270 context 554 (sample square 7310). A lead clench nail (L 13mm, with an oval head D 20mm x 15mm) with a circular cross-section (D 6mm).

13.16 Iron ornaments

M. Parker Pearson

Iron ornaments are very few at Cille Pheadair since bone, antler and copper alloy were the preferred media for such items. Like copper alloy, iron could be recycled and this may also account for their rarity.

Iron pins

The only iron pins from the site are a ringed pin with a broken tip (SF 2275 from phase 3), a complete pin with a cylindrical head (SF 1116 from phase 4) and a complete but crude pin for which the head has been formed by twisting the end round on itself (SF 1023 from phase 5). SF 1023 may perhaps once have been a ring-headed pin.

Ringed pins are known from as early as the Middle Iron Age in South Uist, sometimes pressed into unfired pots to create decoration (Parker Pearson and Sharples 1999: fig. 4.13.11). They have a wide chronological range in the first and early second millennia AD within western Scotland (Foster 1990: 153; Graham-Campbell and Batey 1998: 74–7) and SF 2275 can be dated by its context to the eleventh century. Elsewhere on South Uist, similar examples in copper alloy have been found at Cill Donnain (probably from site 37 of the machair survey; Parker Pearson 2012c: 28) and Bornais Mound 2 (Graham-Campbell and Batey 1998: 82; Sharples forthcoming). The cylinder-headed pin (SF 1116) can be paralleled by similar forms in bone from Cille Pheadair and dates to the late eleventh–early twelfth centuries.

Phase 3

2275 context 701 (sample square 7522). Incomplete iron ringed pin with a circular-sectioned shank (L 32mm, D 7mm) whose tip has been broken off. Its cylindrical head is 4mm high and 10mm in diameter. The oval ring is 19mm–25mm in diameter and 5mm in thickness.

Phase 4

1116 context 317 (15.30E, 112.35N, 6.08OD). Iron pin (L 71mm, D 4mm) with a cylindrical head (D 7mm) (Figure 13.16).

Phase 5

1023 context 128 (13.95E, 103.35N). Iron pin (L 121mm, D 5mm) with its head twisted round on itself. The resultant eye is 7mm × 5mm across (Figure 13.16).

Iron spiral

A snapped-off iron spiral terminal (SF 1563), like the end of a miniature crozier, came from the floor of House 312 in phase 7, as did the similar spiral terminal in copper alloy (SF 1521; see section 13.11 above). The iron spiral is tinned, with lines of thin bands running across its length. It may be the terminal of a pin or some other loop-eyed dress fitting.

Phase 7

1563 context 204. Incomplete iron terminal in the shape of a bishop's crozier (L 26mm, W 25mm, Th 2mm). It is made from a twisted tapering strip (2mm–6mm × 2mm). The X-ray shows that it is inlaid with another metal in 0.5mm-wide bands spaced 2mm–3mm apart and that it

Figure 13.17. Two bone crosses (SF 2193 and SF 2192) from phase 4

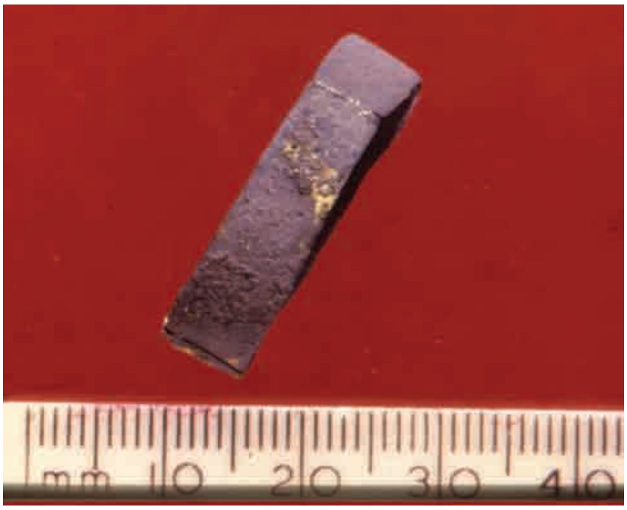

Figure 13.18. A silver ring (SF 1686) from phase 5

Figure 13.19. A copper-alloy 'footing' (SF 2156) from phase 1

Figure 13.20. The head of a copper-alloy stick pin (SF 1475) from phase 5

Figure 13.21. A copper-alloy spiral terminal (SF 1521) from phase 7

Figure 13.22. A copper-alloy annular brooch (SF 1453) from phase 7

Figure 13.23. A copper-alloy feline (SF 1790) from phase 8

Figure 13.24. Two fragments of coiled gold fillet (SF 1924) from phase 3

has been tinned (visible on the X-ray as a bright outline around the object) (Figure 13.16).

Iron rings

Three iron rings were deposited in phase 4, two on the floor of the house (SF 2349 and SF 2223) and one in the midden (SF 2437). With internal diameters of about 5mm, 12mm and 7.5mm, these are too small to have been finger-rings and might have been dress fittings or chain-links.

Phase 4

2223 context 555 (sample square 7333). Small iron ring (D 16mm), circular in cross-section (D 2mm).

2349 context 548 (sample square 7091). Incomplete iron ring or loop (L 21mm) with a circular cross-section (D 6mm).

2437 context 442. Small iron ring (D 17mm), circular in cross-section (D 3mm), with an internal diameter of 7.5mm.

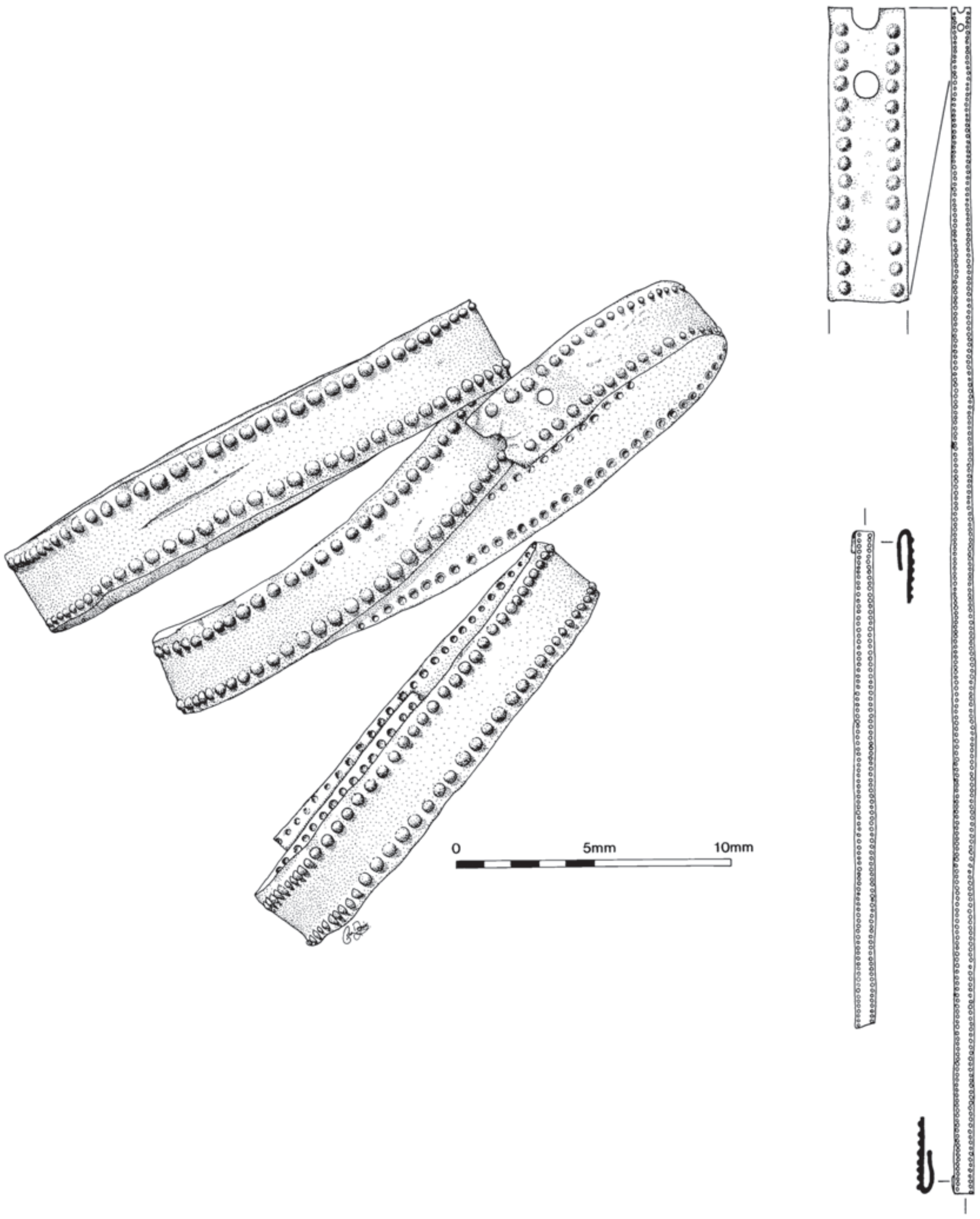

Figure 13.25. Two fragments of gold fillet (SF 1924), shown as coiled (left) and as notionally extended (right)

Iron ferrules

There are two ferrules, both for sheathing the ends of thin sticks or batons. One (SF 1729) comes from phase 4; the other is broken (SF 1040) and comes from phase 9.

Phase 4

1729 context 430. Iron ferrule (L 53mm, D [original, at its neck] 1.7mm), with a welded seam. It would have sheathed a stick 1.4mm in diameter (Figure 13.16).

Phase 9

1040 context 030. Incomplete iron socket (L 37mm, D tapering from 11mm to 4mm). This is probably a small ferrule or tip for a slender stick (Figure 13.16).

Other iron items

Two solid lumps of iron from phase 5 were initially thought to be weights but are unidentified items. One (SF 1902) is simply a 'squashed' lump. The other (SF 2575) is a small

sphere from which a tapered and thinned strip emerges, rather like a flat-ended fin. It is complete but is not a weight.

Phase 5

1902 context 534 (11.42E, 111.80N, 6.17OD). Iron lump (28mm × 30mm × 18mm).

2575 context 219. Sphere of solid iron (D 16mm) with a tapered strip ending in a sharp edge (L 11mm, W 5mm, Th 4mm–0mm) coming out of its side. This appears to be a complete artefact (Figure 13.16).

13.17 Coins

E. Besly

There are three items of silver coinage from Cille Pheadair. The cut halfpenny dating to *c*. AD 1206 was deposited not long after it was minted (see Chapter 11 for dating of this phase) but the Cnut penny from context 394 (covering the abandoned House 500) and probably the triangular fragment from context 328 (a midden deposit) were in circulation for about a century before deposition.

Context 328 (sample square 6308) (phase 3; commencing *cal AD 1030–1095*)

Triangular silver fragment from the rim of an uncertain coin. One side bears a legible letter 'V', the form of which may suggest an Anglo-Saxon coin of tenth-century date. Weight: 0.08g.

SF 1672 context 394 (phase 6; commencing *cal AD 1100–1155*)

Silver penny, Cnut, Quatrefoil type, York mint, moneyer Ulfgrimr.
Obv: +: CVT(*sic*) REX ANGLORVI; crowned bust, l.
Rev: +VL – FGR – I[M]M – OEO; long voided cross on quatrefoil
Weight: 0.48g, much corroded.
From the same dies as *SCBI* 13, 894 and *SCBI* 29, 613. Date *c*. AD 1017–1023.

SF 1031 context 044 (phase 9; commencing *cal AD 1105–1160*)

Silver cut halfpenny, Short Cross coinage of AD 1180–1247; Norwich, moneyer Iohan.
Obv: [hEN]RICVS R[EX]
Rev: +[IOhAN·]ON·NOR
Weight: 0.72g; some wear.
Class $5b_3$, from the same dies as *SCBI* 56, 1565. Dates according to *SCBI* 56: Class 5, *c*. AD 1204–1210; $5b_3$, *c*. AD 1206.
SCBI = Sylloge of Coins of the British Isles:
13: *Royal Collection of Coins and Medals, National Museum Copenhagen, Part IIIa*; by Georg Galster (1970)
29: *Merseyside County Museums*; by Margaret Warhurst (1982).
56: *The J. P. Mass Collection; English Short Cross coins, 1180-1247*; by J.P. Mass (2001).

Full bibliographic details are listed in the Bibliography.

14 The bone and antler tools

C. Paterson

14.1 Bone needles

All the bone needles were ordinary needles with the eye towards the end of the shaft, except for SF 1890 (phase 5) which has an ovoid slot 40mm from its end. It closely parallels an object from the Viking Age settlement at Drimore which has been described as a fish gorge (MacLaren 1974: 17, pl. 2.36), though the Drimore example appears to be rounded at both ends. The Cille Pheadair 'needle' (SF 1890) might have been used for stringing fish, through their mouth and gills, onto lines for drying. The remainder of the bone needles from Cille Pheadair were presumably used for mending clothing, textiles and nets. They were found in phases 4, 5 and 7.

Phase 4

1889 context 504 (sample square 6972). Bone needle that expands in flattened section around a low-set ovoid eye to a now broken point at its head (L 61mm, W 4mm). The shank is of circular section and tapers gradually to a point at the other end. It is similar to examples from the Brough of Birsay (Curle 1982: ill. 8.140) and Killegray in the Sound of Harris (Richard Langhorne pers. comm.).

2042 context 569. Polished shank and point of a fine bone needle (L 58mm, W 3mm). The shank is of indeterminate section, but expands into a flattened sub-rectangular section at the point of fracture across the eye at its upper end (Figure 14.1).

2074 context 569. Worn bone needle of flat, sub-rectangular section with a broad, flattened expansion at the head terminating in a sub-triangular apex (L 47mm, W 5mm). The pear-shaped eye is set low in the head. The back of the needle is composed of exposed cancellous material and the tip is fractured obliquely (Figure 14.1).

2134 context 578. Polished bone needle of ovoid section with flattened, expanded head which terminates in a pointed apex accommodating an elongated eye or slot (L 86mm, W 5mm; Figure 14.1).

2185 context 504. Polished bone shank of sub-rectangular section which is broken at both ends (L 34mm, W 4mm). One end expands, with the break across a probable eye, indicating that this was a needle (Figure 14.1).

2734 context 422. Broken shaft of a large bone needle (L 78mm, D 4mm) with the tip and the head above the eye (D 4mm) broken off.

Phase 5

1890 context 351. Extremely worn bone 'needle' with ovoid slot set 40mm below rounded upper end (L 125mm, W 10mm). Although the external surface of the bone has largely worn away, the profile of this object with its rounded upper end, low-set perforation and even taper to a point, is still apparent. The form of this unusual object suggests that its function was that of a rather specialized needle.

2181 context 533. Polished bone needle, broken across what appears to have been a substantial eye (D 6mm) of probable ovoid form (L 62mm, W [head] 9mm). The shank is of sub-rectangular flattened section at the neck, becoming more rounded as it tapers to the point (Figure 14.1). A similarly proportioned needle has been recovered from Killegray in the Sound of Harris (Richard Langhorne pers. comm.).

2721 context 315. Bone needle (L 57mm, D 3mm), broken on its eye (D 2.5mm).

2732 context 308. Broken shaft of a large bone needle (L 59mm, D 5mm), with the tip and the head above the eye (D 3mm) broken off.

2736 context 308. Tip of a bone needle or pin (L 35mm, D 3mm).

2743 context 351. Bone needle (L 69mm, D 3mm), broken below its eye.

Phase 7

1206 context 200. Lower shank bone fragment of sub-rectangular section with a worn tip (L 39mm, W 4mm, Th 3mm). The fine proportions and sub-rectangular section of this fragment suggest that it belongs to a needle, broken in antiquity.

2475 context 033. Worn bone needle with ovoid eye set 5mm below the irregular upper end. The upper surface is lightly worn and a natural(?) groove runs from the perforation to the break (L 21mm, W 6mm).

2478 context 209. Polished bone needle-shank of flat rectangular section with slight damage to its sides (L 49mm, W 4mm).

2793 context 311. Burnt fragment of a bone needle of flat rectangular section, broken across its ovoid eye and across its shank (L 21mm, W 6mm).

Unstratified

1289 context 001. Polished bone needle (L 53mm, W 4mm, Th 2mm) of sub-rectangular section with the eye (D 2mm) set in the flattened upper portion, above which the bone is fractured, but the original edges of which suggest that the shaft tapered inwards above the perforation. The tapering sides of the shank are rather irregular, possibly through wear, and the point displays wear and possibly signs of reworking (Figure 14.1).

14.2 Bone spindle whorls and spindles

Bone spindle whorls fashioned from femur heads were in use from prehistoric times. At Cille Pheadair they were found from phase 1 to phase 8. In Scotland there are numerous examples from Iron Age sites such as the Broch of Burrian, North Ronaldsay (MacGregor 1974: fig. 17), and the form continues into the Norse period, including examples from Freswick (Curle 1939: 100, pl. XLIX.3–4) and Pool, Sanday (Smith 2007: 498–500).

Within England the use of such spindle whorls reached its peak between the tenth and twelfth centuries, as reflected in over 50 such finds from Coppergate, York (MacGregor *et al*. 1999: 1965–6) and more than 20 finds from Flaxengate, Lincoln (Mann 1982: 22). They also appear to have been in use in Ireland, with nearly 50 examples coming from Waterford, mainly from twelfth-century contexts (Hurley in Hurley *et al*. 1998: 674). Two of the Cille Pheadair spindle whorls are unusually small (SF 2204 and SF 1298) and were probably play-things, for which there are similarly sized parallels from Coppergate, York (Walton Rogers in MacGregor *et al*. 1999: 1964).

There is a possible bone spindle from Cille Pheadair (SF 1239, phase 2). Although bone spindles are known from the Roman period, they became less common (MacGregor 1985: 185–6). However, a possible bone spindle was recovered from Anglo-Scandinavian levels at Lloyds Bank, York (MacGregor 1982: 100–1, fig. 54.510).

Phase 1

2204 context 580. Hemispherical spindle whorl (D 23mm, H 14mm, D [perforation] 7mm), made from a perforated pig femur-head. There is slight damage to its base. The small size of this spindle whorl suggests that it was probably a play-thing (Figure 14.1).

Phase 2

1239 context 339. Long, irregularly worked tapering bone shank, broken at its upper edge and with slight damage to its tip (L 133mm, D 7mm). It has an irregular round section. The crudely carved surface and length of this shank fragment suggest that it might have been a tool such as a spindle as opposed to a dress pin, in which case it is broken in the area of central swelling with only half of the object surviving (Figure 14.1).

Phase 4

1298 context 317. Damaged hemispherical spindle whorl (D 18mm, H 9mm), made from a perforated pig femur-head. The piece is perforated (D 6mm) and shows evidence of wear (Figure 14.1). The small size of this spindle whorl indicates that it might have been a play-thing.

1942 context 130. Hemispherical spindle whorl (D 38mm, H 16mm, D [perforation] 11mm), made from a perforated cattle femur-head. The perforation is off-centre, and the surface and base of the whorl are damaged (Figure 14.1).

2063 context 553. Hemispherical spindle whorl (D 33mm, H 17mm, D [perforation] 8mm), made from a perforated cattle femur-head. Its basal edge is roughly trimmed (Figure 14.1).

2709 context 555 (sample square 7359). Incomplete spindle whorl (D 25mm), made from a femur-head, with a drilled hole (D 7mm).

Phase 5

1577 context 010. Hemispherical spindle whorl (D [max.] 36mm, H 16.5mm), fashioned from a perforated cattle femur-head, with the rough edges at the base having been trimmed. The centre is pierced by a hole (D 9mm). The upper surface of the piece appears to have been smoothed. The underside is uneven and badly abraded.

Phase 7

2696 context 206 (sample square 6607). Spindle whorl (D 31mm), made from an unfused femur-head. The centre is pierced by a drilled hole (D 8mm) (Figure 14.1).

Phase 8

1044 context 058. Hemispherical spindle whorl (D [max.] 42mm, H 22mm, D [perforation] 9mm), made from

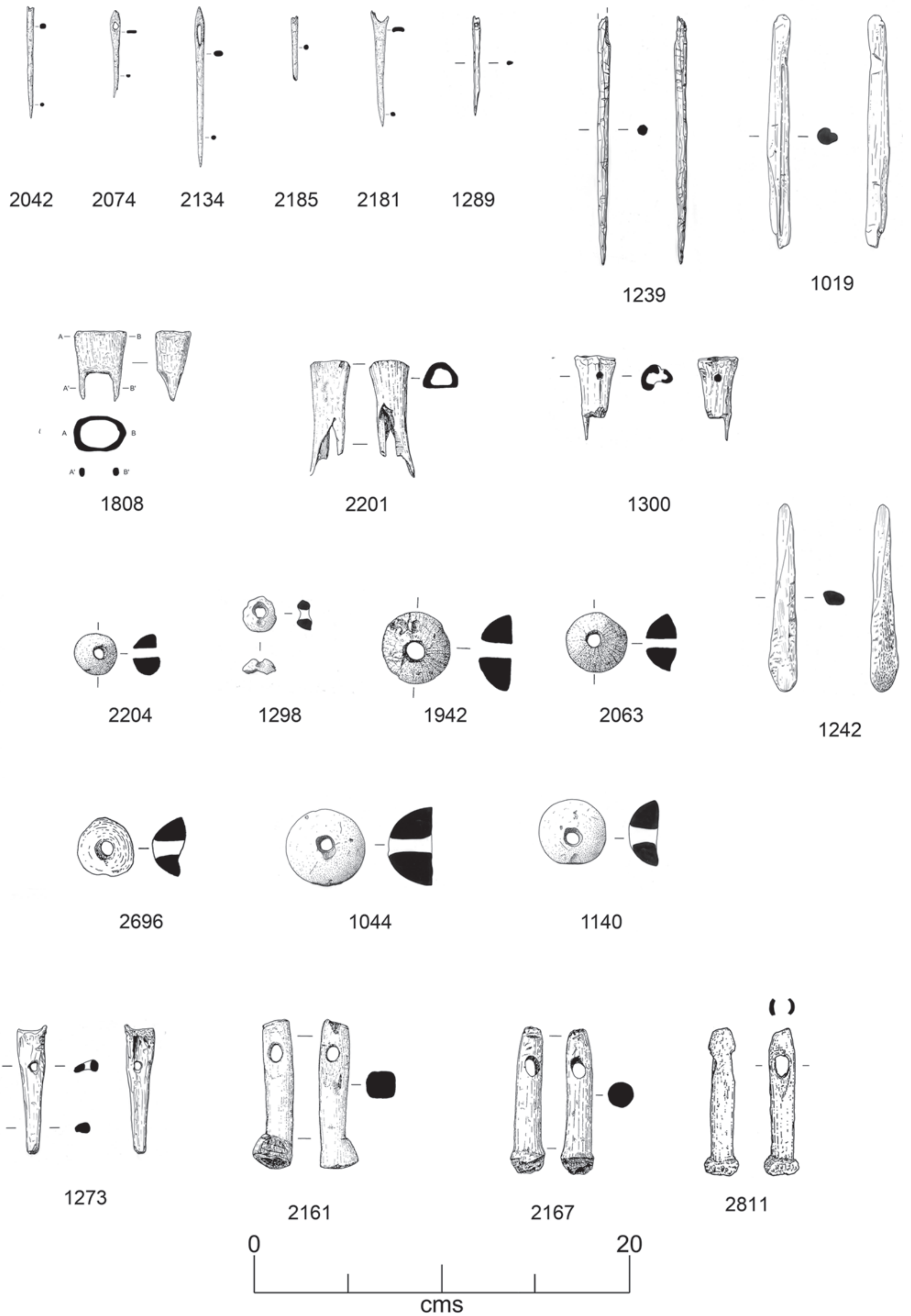

Figure 14.1. Bone and antler tools: needles, lucets, pegs and other items

a perforated cattle femur-head. The domed surface is smoothed and there is evidence of wear around the hole (Figure 14.1).

1140 context 091. Hemispherical spindle whorl (D 36mm, H 16mm), made from a perforated cattle femur-head. The outer surface of the whorl is polished, displaying a cut-mark. The perforation (D 9mm) is set off–centre (Figure 14.1).

14.3 Lucets

These double-pronged, hollowed bones are likely to have been thread-making tools. Such finds are relatively rare and, although some doubt has been cast on this identification (Walton-Rogers in MacGregor *et al*. 1999: 1994), a similar implement from a burial context dating from the second half of the eleventh century in Lund is inscribed in runes with the words *tinbl bein* ('bone for twisting'), affirming its identification as a tool for twining thread (Blomqvist and Mårtensson 1963: fig. 41.57–8).

Similar lucets are known from Castle Acre Castle, Norfolk (Margeson in Coad and Streeten 1982: fig. 46.3) and Thetford, Norfolk (Rogerson and Dallas 1984: fig. 199.96, 182), and the description is more loosely applied to a series of double-pronged implements from York (MacGregor 1999: 1994–6). Three lucets were recovered from Cille Pheadair. The proportions and highly polished surface of SF 2201 closely parallel another example from the Thule excavations in Lund (Blomqvist and Mårtensson 1963: fig. 179).

Phase 2

1808 context 600. Hollow ovoid bone, most probably a sheep metapodial (L 36mm, W 28mm × 18mm). It has a flat base which tapers slightly into two projecting prongs protruding for 15mm from the end. The opposite end is cut roughly flat. The centre has been roughly hollowed out. The outer surface of the piece, including the prongs, is highly polished and there are indications of wear at the base of the prongs (Figure 14.1). The form of this object identifies it as a lucet or thread-making tool. Thread would be manipulated around the prongs to produce a cord which would then pass through the natural hollow in the bone.

2201 context 582. Hollow polished bone, most probably a sheep metapodial (L 61mm, W 20mm, D 14mm), of D-shaped section with a flattened back from which a single prong projects *c*. 10mm. There are signs of wear at the base of this surviving prong, where the bone has been sawn very thin, possibly accounting for the fracture. The neck to what was probably a corresponding prong on the other side has fractured, and there is a deep groove, probably natural, in the flat back of the lucet between the surviving prong and the remains of its counterpart (Figure 14.1). The form of this object, which appears to have originally been double-pronged, identifies it as a lucet or threadmaking tool.

Unstratified

1300 unstratified. Hollow bone, most probably a sheep metapodial (L 45mm, D 22mm), of D-shaped section. It tapers in line with the original form of the bone to a truncation from which a single prong projects *c*. 12mm. Originally it is likely that a further prong projected opposite the existing one in an area now damaged. The lower portion of the bone is perforated (D 4mm) 9mm from the base, with grooves extending below this. This particular example differs from the above two in having this perforation near its base (Figure 14.1).

14.4 Double-ended implements

The function of the two double-ended implements is difficult to determine. They differ from standard pin-beaters in their form. SF 1242 has no pointed terminal, but instead has two spatulate ends which are polished through wear, suggesting that it might have been used for smoothing or burnishing. Whether this function was textile-related is unclear and part of an unresolved debate (Oakley in Williams 1979: 313; Pritchard in Vince 1991: 205). Similar double-ended tools recovered from Iron Age structures at Sollas, North Uist have been described as possible potting tools (Campbell 1991: 158, ill. 21.629). These finds closely parallel modern-day potting tools, from their flattened spatulate ends to the twist into a different plane for the opposing terminal, and bone was commonly used for potters' stamps (MacGregor 1985: 194).

Phase 7

1019 context 022. Double-ended bone spatula (L 125mm, W 11mm). It is made from a polished long bone with a natural groove down one face, worked to a sharpened, rounded blade at both ends. The central portion is of sub-triangular section, then flattening out at both ends, one into a finely worked, rounded end, the other end being broken where the blade has snapped at the tip. The natural hollow of the bone appears as a smoothed groove running longitudinally down one face. The surface is polished from use (Figure 14.1).

Unstratified

1242 unstratified. Highly polished bone (antler?) implement (L 99mm, W 15mm), with an irregular ovoid section that twists into one finely worked, flat rounded end, the other end being more coarsely worked and broader (Figure 14.1).

14.5 Pegs and perforated pegs

There are three possible bone pegs from Cille Pheadair. SF 1540 from phase 8 is perforated, the others are not. The four pegs made from modified antler tines are all perforated. Their purpose is unknown. The unusual hipped protrusion close to SF 2161's basal end is similar to that of a zoomorphically decorated tine from York (MacGregor

et al. 1999: fig. 950.7953), although the York basal end is perforated too.

Phase 1

2161 context 717. Modified polished antler tine (L 79mm, D 15mm, D [base] 21mm) with an ovoid perforation (D 9mm), 13mm from one of its terminals. The peg tapers slightly towards the other terminal, characterized by a distinctive one-sided hip extending *c*. 15mm prior to the flat base, with a slightly chamfered edge. Horizontal cut-marks appear at the base and upper terminal, and there are signs of wear and a general flattening in the area of the perforation (Figure 14.1). The function of this object is unclear but it closely resembles SF 2167, SF 1540 and SF 2811.

2167 context 723. Modified antler tine (L 79mm, D 14mm, D [base] 18mm) with an ovoid perforation (D 11mm), 17mm from the narrower of its two terminals. The broader end has numerous horizontal cuts, possibly made when the tine was separated from the beam. There are also horizontal cuts in the area of the upper terminal. There are signs of wear on the tine's smooth worked surface, particularly in the area of the perforation (Figure 14.1). The function of this object is unclear but it closely resembles SF 2161, SF 1540 and SF 2811.

Phase 4

2036 context 539 (sample square 7406). Bone peg.

Phase 5

1540 context 385. Fragment of modified antler tine (L 20mm, D [max.] 13mm), with a sawn upper terminal, the other end being fractured through a perforation (D 6mm). The tip of the tine has been cut off from the piece and the end has been smoothed flat. The sides of the piece have been trimmed and smoothed and there are two deep, horizontal cut-marks close to the upper terminal on one face and across the top of the perforation on the other face. The antler has broken across the line of this hole. It is the tip of a perforated peg-head. The function of this fragment is unclear, but it closely resembles SF 2161, SF 2167 and SF 2811.

Phase 7

2480 context 322. Short section of bone that hardly tapers and has a roughly worked surface which is approximately round in section (L 56mm, D 6mm–7mm). One end appears broken in antiquity and the other is squared and worn smooth apart from some slight damage. Although superficially pin-like, the rough shank, absence of tapering and smooth, squared end make identification as a small peg more likely.

Phase 8

1273 context 052. Possible bone peg with an expanded, perforated head (L 68mm, W 7mm–17mm), probably made from a pig fibula. The piece tapers to a rounded point at one end and the opposite end is roughly smoothed. The bone is pierced with a hole (D 5mm–6mm) towards the blunt end. The perforation sits low in the expanded distal-end head, which has been modified slightly with upturned terminals. The shank is of sub-rectangular section, with a broad natural groove down one face. The blunt terminal appears to have been recut (Figure 14.1). It is possible that this object was originally a dress pin that was recarved for secondary usage, possibly as a peg or textile implement; the latter use would have been restricted to coarse open weaves on account of this artefact's blunt terminal.

Phase 9

2811 context 070. Modified antler tine (L 77mm, D 12mm, D [base] 17mm) with an ovoid perforation (D 12mm), 12mm from the narrower of its two terminals. The broader end has numerous horizontal cuts, possibly made when the tine was separated from the beam. There are also two horizontal cuts in the area of the upper terminal, which appears to have lost its tip. There are signs of wear on the tine's smooth worked surface, particularly in the area of the perforation (Figure 14.1).

14.6 Possible antler arrowhead

SF 1107 (phase 5) is almost identical to a large number of hollowed-out antler tines from Hedeby (Ulbricht 1978: 56, Taf. 46; Graham-Campbell 1980: 12, no.14), which have been tentatively identified as arrowheads, and is similar to an unidentified find from Birka (Arbman 1940: Taf. 157.5).

Although at first such an identification appears incongruous, a group of eight modified, hollow bone objects was found together with other hunting equipment in a burial from Engholmen, Helgöy, Karlsöy, northern Norway (Sjøvold 1974: pl. 32) where they have been described as blunt arrowheads for fur-hunting (*ibid*.: 292). Further examples of similarly specialized blunt arrowheads, in this case of a cylindrical form, have been identified and discussed in the light of ethnographic parallels (MacGregor 1985: 162–3). Smaller sections of worked antler tine from York have been described as ferrules (MacGregor *et al*. 1999: 1999–2000). The hollowing-out of the antler for attachment to a shaft would appear to be an unusual trait (MacGregor 1985: 162).

Phase 5

1107 context 314. Straight antler tine which has been sawn off and hollowed out to form a ferrule-like object (L 66mm, D 16mm). The point is roughly rounded and slightly polished. The surface of the point has multiple abrasions, scratches and cut-marks, probably from working and use. The opposite end has been cut flush across the tine and has been hollowed (Figure 14.2). Approximately 3mm from the sawn edge are two perforations (D 3mm–4mm), positioned approximately opposite each other, presumably for securing a shaft in the socket. The socket extends to a depth of 40mm, for use of this object as a ferrule, tool or

projectile tip (MacGregor 1985: 162). Two small breaks have formed into cracks running longitudinally from the sawn edge on the rim of the hollowed end and might have been caused while the tool was in such use.

14.7 Bone toy spearhead

Phase 3

1223 context 336. Pointed bone object (L 62mm, W 13mm) with a damaged cylindrical socket which tapers 14mm to the neck, whence short shoulders emerge and then taper to a now damaged tip. The blade has prominent midribs on both sides. This miniature bone point closely resembles a spearhead (Figure 14.2). Its proportions are less slender than those of full-size metal spearheads, particularly in the area of the neck, presumably because of constraints of material and size. Its stocky appearance, with a short broad socket and shoulders, approximates to Petersen's type G spearhead, which was current in the tenth and eleventh centuries (Petersen 1919: 29–30), but the form may simply be representational. An alternative identification of this object as an arrowhead is unlikely on account of its socketed form; pointed bone arrowheads tend to be tanged (MacGregor 1985: 162). Miniature metal spearheads are known from Viking contexts where they have been interpreted as amulets (Arrhenius 1961: 144 ff). Although such an interpretation is possible for the Cille Pheadair find, it seems reasonable to identify this object as a toy spearhead, unique though complimented by wooden toy swords from Norse contexts.

14.8 Socketed points

The function of socketed bone points is very unclear (MacGregor 1982: 967). Three were recovered from Cille Pheadair.

Phase 3

1196 context 328. Socketed point made from a sheep metatarsal (L 97mm, D 19mm), the proximal end of which has an axial perforation. The 'tip' may be a secondary break, but a tip of some description was most probably intended, as there are cut-marks in this area, as well as some along the length of the bone. The bone has a smoothed surface and several longitudinal cut-marks. One end has possibly been smoothed and the opposite end has cut-marks and is broken.

Phase 5

1295 context 308. Socketed point made from a sheep metatarsal (L 65mm, D 21mm), the proximal end of which has an axial perforation. Oblique cuts have been made to create a now damaged tip, the sides of which are worn smooth but have now flaked away in part.

Phase 7

1274 context 060. Socketed point made from a sheep metatarsal (L 81mm, D [max.] 18mm), the proximal end of which has an axial perforation. Much of the bone has been cut away and the edges, polished through wear, lead to a blunt, obliquely rounded terminal. There are several transverse cuts in line with the proximal end. The bone is splintered but there is polish on the surface and the broken edge, suggesting use after breaking. The end is unworked but displays numerous knife cut-marks, possibly from butchery (Figure 14.2).

14.9 Pin-beaters

There are four examples of bone and antler pin-beaters from Cille Pheadair. These single-ended pin-beaters would have been used with a two-beam vertical loom, which was in use from the tenth century onwards (Walton-Rogers in MacGregor *et al*. 1999: 1967–8).

Phase 3

1697 context 320. Single-ended pin-beater with a squared-off upper end (L 110mm, W 11mm). The piece is a thinned and smoothed antler tine, flattening to one end where the centre of the tine is visible. The opposite end is worked into a long, rounded point. There is exposed cancellous tissue on this upper end and on the back, which is slightly grooved. The upper cross-section is sub-rectangular, becoming more ovoid towards the polished and finely worked tip.

Phase 4

1885 context 430. Worn single-ended bone pin-beater in two fragments (L 119mm, W 14.5mm). The piece tapers from an abraded, roughly smoothed and flattened blunt end into a smoothed rounded point. The surface of the point is polished. There is slight damage to its squared-off upper end. The cross-section is sub-rectangular for much of the implement's length, becoming circular just prior to the tip (Figure 14.2).

Phase 5

1054 context 306. Polished and worn bone point with shank of sub-rectangular section (L 50mm, D 9mm, Th 5mm). The break precludes a definite identification, but the rectangular cross-section indicates that it is probably the lower section of a pin-beater or pick-up (Figure 14.2). 'Picker-cum-beaters' with similar flattened cross-sections and points have been recovered from Coppergate, York (MacGregor *et al*. 1999: 1967)

Phase 7

1430 context 204. Single-ended bone pin-beater with a modified butt end (L 145mm, W [max. at head] 17mm, W [shaft] 11mm). It is a roughly trimmed and smoothed piece with a slight neck prior to the shank, and tapering to a finely worked point. The opposite end has been roughly smoothed. The hollow centre of the bone is visible down one side of the head and the shaft. The surfaces are polished. The natural grooves of the bone are apparent on

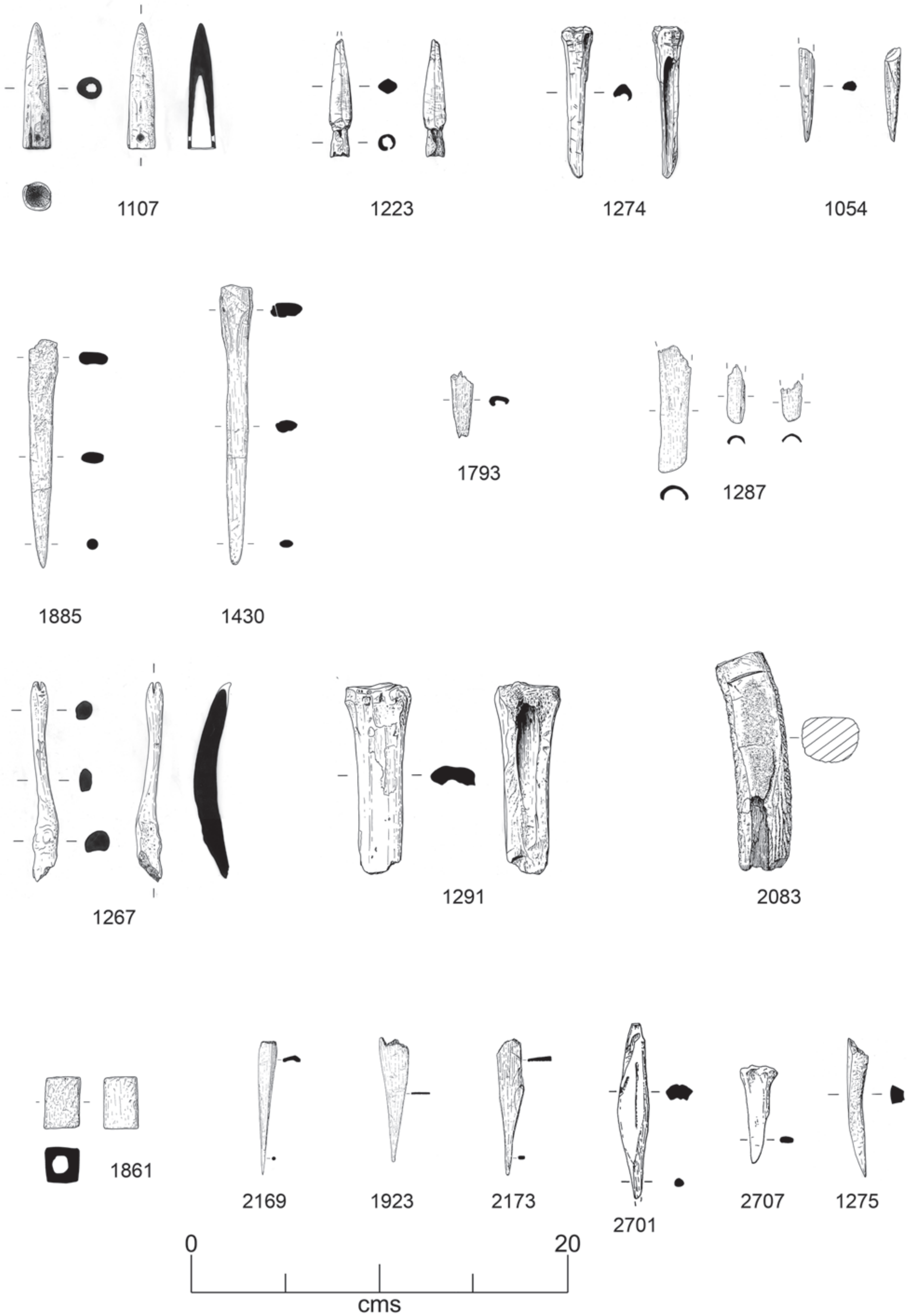

Figure 14.2. Bone and antler tools: points, handles and other items

one side, probably determining the unusual form of this beater. Its cross-section is sub-rectangular for most of its length (Figure 14.2).

14.10 Scoops

The suggested function for later bone scoops ranges from apple-scoops to cheese-testers (MacGregor 1985: 180; see Olsen 2003: 107 for the problem of the early twentieth-century parallel of 'apple-scoop'). Scoops are rarely found in medieval contexts. There is, however, a close parallel to SF 1793 from Fishergate, York (MacGregor *et al*. 1999: 1974, fig. 929.8156). The other possible scoop from Cille Pheadair (SF 1287) is more rounded in form.

Phase 4

1793 context 366. Fragment of worked bone (L 35mm, W [max.] 11mm, Th 7mm). The piece is U-shaped in profile and is a fragment of long bone with the centre hollowed and smoothed. The piece narrows from one end to the other and might have originally been worked to a point. The external surface is also smoothed and is slightly polished. Although damaged at both its upper and lower ends, the tapering side-walls identify this fragment as the lower end of a scoop (Figure 14.2).

Phase 7

1287 context 202. Fragment of long bone wall, probably sheep metapodial (L67mm, W 16mm), the proximal end of which appears has been neatly cut to form a scoop. The external surface of the bone is smoothed and one end has been cut to a smooth edge. The opposite end and the sides are broken. There are two further fragments of long bone wall of narrower width (Ls 31mm, 24mm) which also have finely cut, obliquely rounded terminals (Figure 14.2). Although the sides of this bone are damaged, its neatly cut end suggests that it was intended as a scoop.

14.11 Saw-bow

A rib bone (SF 1267, phase 7) has a worn cleft in its narrow terminal, suggesting that it might have been adapted for use as a bow to hold the blade of a small saw. Such objects are rarely identified, despite having clearly been a common-place tool, particularly in light of the amount of sawing involved in comb manufacture. Two larger, more elaborate saw-bows have been identified in the Viking-Age assemblages from York and Dublin (Hall in MacGregor *et al*. 1999: 1945–7) and there is an example from Hedeby (Ulbricht 1978).

Phase 7

1267 context 204. Rib bone with a recent break at its broader end (L 106mm, D 13mm), with an 8mm-deep cleft cut into its narrow terminal. The piece is smoothed and there are clear signs of wear and abrasion around the cleft, with a groove following the line of the notch on its underside. The opposite end is broken. The cleft with its signs of wear, together with the natural arch of this rib bone, indicates that this tool might have been used as a bow securing the blade of a small saw (Figure 14.2).

14.12 Possible wedge

A tapered cattle metapodial may be a wedge, a function proposed for similarly worked metapodials from Coppergate, York (MacGregor *et al*. 1999: 2001, fig. 961.7225–6).

Phase 9

1291 context 044. Split and roughly hacked cattle metapodial cut in half lengthways (L 100mm, W [max.] 36mm), with its depth tapering towards a squared-off terminal rounded on one side and broken on the other. One end is cut to a narrowed edge and is roughly smoothed and abraded. The graded thickness of this bone, together with wear on its upper surface, suggests that it might have been used as a wedge (Figure 14.2).

14.13 Handles

A large and worn piece of antler beam (SF 2083) has a socket and perforation that suggest use as a handle. An antler tine (SF 1853) might also have functioned as a handle. Although this possible handle is crudely made, it was not unusual for the original antler surface to be retained in knife-handles of the period (Ulbricht 1978: 80, Taf. 41.8, 41.10). The cuts at the basal end are worn with slight grooves, indicating a secondary adaptation to a wedge, with similar reuse of hollow-based tines being noted at York (MacGregor *et al*. 1999: 1998, fig. 997.7793, 7795).

Phase 3

1853 context 528. Antler tine (L 111mm, D 25mm) from which the tip has been removed, leaving an irregular edge with a circular hollow (D 6mm) of *c*. 90mm depth. The piece has been roughly hacked on two sides, forming a rough wedge at one end. There are numerous cut-marks around the narrowed, base end where the tine was detached from the beam, with two broad cuts on opposite sides and narrower cuts between. The opposite end is broken. The external surface of the opposite end is unworked but the centre of the tine has been hollowed. It is unusual that the hollow in this tine extends from the tip end as opposed to the base, hollowed bases more commonly functioning as handles (MacGregor *et al*. 1999: 1998). The depth of the perforation suggests that it probably secured a tang for an implement of some description.

Phase 4

2083 context 569. Substantial section of antler beam, the base of which has been sawn off and is polished through wear (L 128mm, D 35mm). A substantial slice has been rather crudely sawn off one of its long sides, in which a broken perforation (D 6mm) is apparent 33mm from the damaged tapering end. This end has had its medullary

tissue removed and has been hollowed out to a depth of *c*. 45mm. Towards the opening the antler appears worn and discoloured from use. The socket and perforation (for securing a tang perhaps?) in this modified beam fragment suggest that it functioned as a handle, with signs of wear at both ends (Figure 14.2).

14.14 Cut cylinder

The function of this well-finished object is a mystery, but parallels are known from Hedeby (Ulbricht 1978: 56, Taf. 43) and late eleventh- and twelfth-century contexts in Ireland, Dublin and Waterford in particular (Hurley in Hurley *et al*. 1998: 685), where they have on occasion been found in sets or strung, suggesting a possible link with textile production.

Phase 1

1861 context 608. Although this object (L 25mm, W 18 × 19mm) belongs to a group of objects described as cut cylinders, this example would best be described as an elongated cuboid: it has four rectangular faces and approximately square flat ends, which are perforated. The perforation is ovoid (D 9mm) with a polished interior, as is the exterior (Figure 14.2).

14.15 Bone points

Where metal is scarce, points and awls are often fashioned from bone, with similar tools having been recovered from A'Cheardach Mhor (Young and Richardson 1960: fig. 13.34–6), Pool, Sanday (Smith 2007: 495–8) and Jarlshof (Hamilton 1956: 123). Bone points are the most numerous bone tools from Cille Pheadair. The vast majority are crudely made, for expedient use and discard. Some are likely to have been used as awls in leather-working. Several are made from pig fibulae but most were selected from small, unidentifiable fragments of bone, one end of which was worked into a point. They are found in every phase except for phase 9 and are most numerous in phase 5. Bone points occur on sites of all periods on the South Uist machair, from the Bronze Age deposits of Cladh Hallan onwards, with no evident change in shape or size.

Catalogue

Phase 1

1860 context 608. Finely worked bone point (L 60mm, W 6mm) of sub-rectangular section with a natural groove down one face. The sides start to taper *c*. 33mm from the tip.

2169 context 762. Tapering polished bone point with a natural groove down one face (L 72mm, W 9mm). Its upper surface is polished and it has a finely fashioned point and square-cut broad end (Figure 14.2). This point would have functioned as an awl, possibly associated with leather-working.

2805 context 607. Two broken pieces of the mid-section (L 58mm, W 7mm) of a slender bone point (missing both ends).

Phase 2

1239 context 339. Bone point (L l33mm, W [max.] 6mm). The piece has been roughly trimmed and smoothed. The surface appears badly abraded and several cut-marks are visible. The point is chipped and the opposite end appears to be broken.

1923 context 452 (E14. 2; N 111.78; OD 5.73). Tapering and lightly worn sliver of bone, smooth on one face and cancellous on the other, with a flat cross-section (L 66mm, W 15mm). It is damaged at its broad end and starts to taper to a blunt tip *c*. 50mm from it (Figure 14.2). It probably functioned as an awl or graver.

2681 context 582. Bone point (L 55mm, W 5mm).

2682 context 600. Bone point (L 58mm, W 14mm) made from the left tibia of a pig. Its tip has broken off.

2684 context 457. Tip of a bone point (L 37mm, W 8mm).

2685 context 334. Bone point (L 73mm, W 9mm) whose tip has broken off.

2686 context 582. Tip of a bone point (L 41mm, W 6mm).

2687 context 618. Tip of a bone point (L 26mm, W 5mm).

2688 context 618. Fragment of the tip of a large whittled bone point (L 55mm, W 16mm).

2766 (unstratified within phase 2). Bone point (L 64mm, W 5mm).

2804 context 453. Bone point (L 66mm, W 14mm). It may be complete but its proximal end is snapped, though whether this occurred before this splinter was made into a point cannot be established.

Phase 3

2173 context 701 (sample square 7588). Tapering worked point of bone with a smooth, worn upper surface and point (L 58mm, W 10mm). From its broad broken end, parallel sides emerge that start to taper *c*.35mm from the point (Figure 14.2).

2689 context 701 (sample square 7617). Bone point (L 50mm, W 4mm) made from a sliver of bone.

2690 context 701 (sample square 7533). Bone point (L 62mm, W 9mm) whose tip has broken off.

2708 context 528. Bone point (L 100mm) made from the metatarsal of a sheep/goat.

2733 context 528. Bone point (L 51mm, W 7mm).

2748 context 528. Bone point (L 64mm) made from the metacarpal of a sheep/goat.

2800 context 319. Broken head of a bone point (L 44mm, W 23mm) made from a cattle metapodial.

2801 context 319. Complete bone point (L 81mm, W 15mm).

2803 context 701 (sample square 7616). Complete bone point (L 74mm, W 10mm).

Phase 4

1288 context 317. Fragmentary bone point (L 39mm, W 5mm), of tapering D-shaped section with a finely faceted tip. This tool has a sub-rounded profile with one flattened edge tapering to a sharp point. The opposite end is broken. Although this fragment could have formed the lower shank of a pin, its D-shaped section is more in keeping with its being an implement such as an awl.

1447 context 358. Bone point (L 77mm, W [max.] 9.5mm), fashioned from a twisted bone which is of sub-rectangular cross-section by the time it tapers to a point. The piece is roughly trimmed and smoothed, tapering into a long, round-profiled point at one end. The opposite end is broken. The surface displays slight traces of polish.

1676 context 504 (sample square 6976). Bone point (L 57mm, W 9mm).

2710 context 531. Bone point (L45mm, W 12mm).

2711 context 504 (sample square 7250). Bone point (L 80mm, W 12mm) whose tip is smoothed.

2713 context 544 (sample square 7139). Whittled bone point (L 63mm, W 14mm) whose tip is missing.

2714 context 569. Bone point (L 56mm, W 6mm).

2716 context 474. Tip of a bone point (L 27mm, W 9mm).

2718 context 366. Crudely whittled bone point (L 61mm, W 19mm) with the tip broken off.

2746 context 317. Bone point (L 63mm) made from the right tibia of a pig.

2771 context 366 (sample square 6661). Bone point (L 49mm, W 6mm).

Phase 5

1051 context 010. Bone or antler point (L 69mm, D [max.] 4mm). The point is long and tapering and the opposite end is broken. The surface is smooth and highly polished, displaying abrasions and two cut-marks.

1270 context 308. Crudely worked bone point (L 57mm, W 7mm), of irregular ovoid section with a natural groove down one face. The point is roughly polished. This tool is broken at its upper end and along one side it appears to begin to taper *c.* 20mm from its blunt terminal. The surface of this tapering section is polished through wear with slight indentations, possibly from where the tool was gripped. As only the point has been worked, this object was most probably a tool, possibly an awl for leather-working.

1283 context 010. Bone point (L 39mm, D 2mm–4mm). The tip and the opposite end have both been snapped off. The surface is slightly polished.

1299 context 308. Roughly worked and cut bone point (L 43mm, D 7mm), of irregular section. The slightly upturned point has a slight curve and the tip has been snapped off. The opposite end is broken. The crude nature of carving suggests that this was either an unfinished pin-shank or a tool point.

1410 context 351. Bone point (L 52mm, D [max.] 6mm). The shaft is round and slightly flattened in profile, tapering to a short, sharp point. The opposite end is broken. The surface of the bone is polished. It may be the tip of a bone pin.

1880 context 114. Bone point (L 48mm, W [max.] 10mm). The piece is a split bone with a worked point which begins to taper *c.* 22mm from the tip. The surface of the point displays a degree of polish.

1884 context 351. Bone point (L 70mm, W 13mm), made from a pig fibula shank. It has broken sides which eventually taper to a worked, blunt point. The piece has been smoothed to a rounded point at the narrow end of the fracture and shows signs of polish.

1887 context 534. Curved shank of a bone point (L 92mm, D [max.] 5.5mm), of irregular sub-rectangular section, with a natural groove down one face which tapers to a point. The piece is a trimmed rib bone worked to a tapering point at one end. The opposite end is broken.

2701 context 507. Bone point (L 93mm, W 15mm) whose end has been carefully whittled but the tip is broken off (Figure 14.2).

2706 context 308. Bone point (L 100mm) made from the metatarsal of a sheep/goat. Its tip has been broken off.

2707 context 325. Bone point (L 44mm) made from the metatarsal of a sheep/goat (Figure 14.2).

2717 context 503 (sample square 7286). Bone point (L 48mm, W 10mm).

2722 context 315. Whittled bone point (L 69mm, W 11mm). Its tip has been broken off.

2725 context 386. Tip of a bone point (L 28mm, W 6mm). Its tip has been broken off.

2740 context 507. Bone point (L 60mm, W 9mm).

2744 context 351. Bone point (L 32mm, W 10mm).

2745 context 351. Bone point (L 58mm, W 11mm) with one long side smoothed to a slightly concave surface.

2747 context 351. Bone point (L 26mm) made from the metacarpal of a sheep/goat.

2749 context 315. Bone point (L 48mm) made from the metacarpal of a sheep/goat.

Phase 6

1429 context 341. Worn bone point (L 49mm, W [max.] 6.5mm). Although damaged, it appears to taper *c.* 22mm from its tip. The piece is a bone splinter flattened down one side and worked to a rounded point at one end. The worked portion is of sub-rectangular section. The opposite end is broken. The surfaces of the bone are badly abraded.

1640 context 398. Fragment of a crudely cut long bone (L 87mm, W 6mm–10mm), of flat rectangular section. The sides start to taper *c.* 40mm from its terminal. The piece is a roughly hacked long bone splinter, worked to a rounded point at one end. The tip of the point is broken. A possible awl.

1641 context 398. Tapering worked bone splinter (L 76mm, W [max.] 17mm), with a missing point. The upper terminal has been modified, but natural grooves determine the irregular sub-triangular cross-section of the shank, which has fine horizontal cuts all down one face. The wide end of the bone has been slightly smoothed and the bone has been split longitudinally. The surfaces are slightly polished. Although the tip is missing, this was presumably a pointed tool of some description.

1870 context 413. Bone point (L 78mm, W [max.] 10mm). The piece is a pig fibula shank with a natural groove down one face, smoothed and tapered in a curve of ovoid section to a long, worked point. The hollow centre of the bone is visible down one side. The edges and surfaces of the bone are polished.

2729 context 341. Incomplete shaft of a smoothed bone point (L 35mm).

2730 context 394. Bone point (L 60mm, W 5mm).

2731 context 398. Bone point (L 55mm, W 9mm).

2739 context 408. Tip of a bone point (L 25mm, W 6mm).

Phase 7

1461 context 214. Bone point (L 60mm, W [max.] 5mm), of sub-rectangular section with a broken tip and a squared-off terminal at the other end in a different plane. The piece is a splinter of bone worked to a crude point at both ends. The tip of one of the points is broken. The surface of the bone is highly polished.

1468 context 214. Flat bone sliver (L 41.5mm, W [max.] 7mm, Th 1mm), cut to a point,. The piece is a triangular splinter of bone, worked to a rough point at the thin end. The upper surface is slightly polished.

1886 context 116. Fragmentary bone point (L 32mm, W [max.] 8mm), of sub-rectangular section with a natural groove on one face. The piece is roughly sharpened to a point, and the sides begin to taper *c.* 20mm from the broken tip. The shaft is broken.

1888 context 322. Bone point (L 60mm, W [max.] 10mm), with a shank of rectangular cross-section, flat on one broad face and slightly concave on the other. Its parallel sides start to taper *c.* 16mm from its damaged point, the faceted cuts for which are still identifiable. The surface of the point is polished and the tip is broken. A possible awl.

2477 context 209. Substantial bone point or awl (L 79mm, W 24mm) fashioned from an ulna (?). It has polished surfaces from wear and a slight hip *c.* 20mm from the tip and a tendency to curve to one side.

2680 context 204 (sample square 6527). Bone point (L 57mm, W 8mm).

2697 context 300 (sample square 6036). Fragment of whittled bone (L 36mm, W 8mm) whose broken tip might have been a point.

2798 context 060 (sample square 6366). Shank and tip of a broken bone point (L 51mm, W 6mm).

2799 context 303. Bone point (L 71mm, W 15mm) with the tip broken off.

Phase 8

1002 context 004. Crudely worked bone point (L 47mm, W 7mm), with a natural groove down one face. It is a roughly smoothed bone fragment worked to a point at one end and broken at the opposite end. Its parallel sides taper sharply to a point *c.* 15mm from its blunt terminal. The lack of finishing, together with the groove, suggests that this was a tool rather than a pin-shank. It possibly functioned as an awl.

1275 context 017. Four-sided fragment of bone (L 74mm, W 12mm), which twists and tapers into a point. A roughly hewn splinter of bone split longitudinally, worked to a point at one end and roughly cut or hacked at the opposite end.

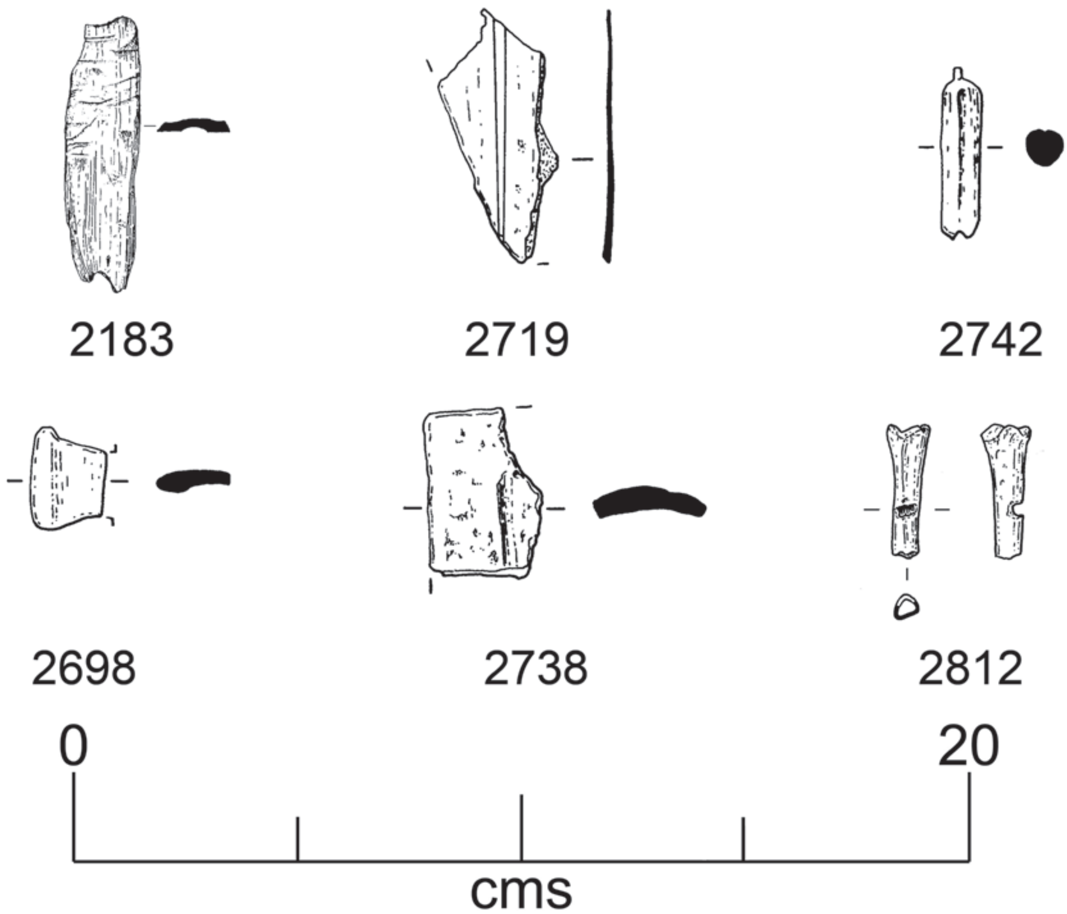

Figure 14.3. Miscellaneous worked bone

Approximately 20mm before its blunt point, the fragment is of ovoid section and polished through wear (Figure 14.2). As only the point has been worked, this object was most probably a tool, possibly an awl for leather-working.

2481 context 355. Fine worked bone point (L 55mm, W 8mm), polished smooth on one face. It has a slight hip *c.* 20mm from the tip.

Unstratified

1293. Worn and damaged fragment of a tapering bone object (L 58mm, W 13mm, Th 8mm), of sub-triangular section with a natural groove at its upper end. The form of this object is similar to that of a truncated pin-beater, though it might have had a different function such as a peg.

14.16 Miscellaneous bone artefacts

Catalogue

Phase 2

1207 context 332. Fragment of sheep metatarsal (L 68mm, W [max.] 20mm), with its central cavity exposed and possible wear to its cut edges. The shaft is split and broken at one end and the obliquely angled point is now detached.

2806 context 600. Cattle femur-head (L 18mm, D 36mm), trimmed on its underside to form a slightly convex surface which has been smoothed but not enough to eradicate the knife-marks. It might have been a counter or a child's toy, or a blank for a spindle whorl.

Phase 3

1202 context 328. Fragment of hollow bone (L 35mm, W 10mm). This piece of bone (sheep metatarsal?) has a smoothed, flattened edge and numerous faint transverse cut-marks. The piece is broken at both ends.

2183 context 459. Fragment of bone (L 49mm, W 13mm) with a notch (possibly damage) at one end, below which is a worn groove and a heavily worked area of transverse cuts (Figure 14.3).

Phase 4

2071 context 553. Fragment of polished long bone (L 53mm, W 15mm).

2719 context 553. Cut segment of scapula (L 56mm, W 23mm, Th 2mm), cut almost cleanly along three of its edges and with two converging straight lines scored on one surface (Figure 14.3).

Phase 5

1294 context 023. Roughly shaped bone fragment (L 35mm, W 12mm) with a triangular apex which tapers to a break.

1568 context 010. Fragment (L 70mm, D 21mm) of the worn (water-worn?) tip of a sheep/goat's horn core (Stephen Ashby pers. comm.), of sub-triangular section, from which a wedge of triangular section has been cut.

1600 context 219. Gull's radius (L 144mm, D 8mm) with a break, possibly natural, though these bones have been found with worked points at a variety of sites, including Foshigarry (Hallén 1994: 15, ill. 10.16), York (MacGregor 1999: 1976) where they were possibly intended for writing with, and Jarlshof (Hamilton 1958: 123, no.163, fig. 57.11) where a double-pronged terminal has been tentatively identified as a fish-hook extractor.

2202 context 530. Fragment of shaved bone or antler (L 21mm, W 9mm), probably waste from a manufacturing process.

2742 context 507. Snapped end of a bone shaft (L 38mm, W 6mm, Th 6mm), of sub-square section. The fragment is trimmed and polished, and a small nipple protrudes out of its rounded end (Figure 14.3)

Phase 6

2698 context 341 (sample square 6612). Trimmed and polished fragment of tapered bone, snapped off (L 23mm, W 16mm, Th 4mm). This resembles an arm of a cross but is less well made than the bone crosses (Figure 14.3).

2738 context 408. Broken fragment of flat, curved worked bone (L 37mm, W 25mm, Th 5mm), with two long sides meeting at a rectangular corner (Figure 14.3).

Phase 7

1276 context 311. Pointed bone (L 41mm, W 1mm–5mm). Possibly not worked.

1279 context 046. Sliver of bone (rib?) fragment (L 19mm, W 18.5mm, Th 1.5mm). The piece appears to be cut along one straight edge and along one neatly cut curved edge, with a break between the two. It is unclear what the function of this fragment was, but it is very finely cut. Although thin, it is unlikely to have been a mount as a slight curvature is apparent. It is possibly the tip of a spatula.

2699 context 375 (sample square 6759). Rib fragment smoothed on all sides (L 34mm long, W 13mm).

Phase 8

2812 context 058. Distal end of a cat tibia (L 28mm), with a 6mm-long x 2mm-wide cut made transversally across the bone (Figures 14.3, 18.13).

Unstratified

1297 context 001. Fragment of bone with a rounded worked end, smooth on both its upper and particularly its lower surface from continued wear of some description (L 57mm, W 30mm).

14.17 Worked antler fragments

Catalogue

Phase 1

2030 context 323. Slender tine (L 161mm, D 30mm) with a blackened, damaged tip and signs of working over much of its surface. There are longitudinal striations on the taper towards the tip, and numerous clusters of slightly oblique short cuts, indicating that it was possibly used as some kind of protective rest on which to cut fine objects (Figure 14.4).

2153a context 587. Blunt tip fragment (L 41mm, D 12mm) of an antler tine with a cluster of cuts and cut-away section.

Phase 2

2104 context 600. Small antler tine (L 86mm, D 18mm) with a distinctive kink. Its tip is slightly damaged and the base has been partially sawn and snapped off, with a trial cut close to the break (Figure 14.4).

2113 context 573. Half a basal burr from a naturally shed antler (D 43mm, Th 15mm). Cut-marks almost parallel with the corona show that the beam was sawn off close to the burr. The burr is hollowed out with a perforation (D 16mm) which is smooth from wear (Figure 14.4). Complete burrs with the centre cut away, leaving the peripheral coronet, might have functioned as fasteners (Ulbricht 1978: 81, Taf. 42.6–7; MacGregor 1985: fig. 61j–k), with possible amuletic powers long associated with antler (*ibid*.: 107–8). Ascribing a function to half a burr is problematic, but it is likely that in this case the edges reflect unintentional breaks.

2117 context 573. Fragment of tine (L 84mm, D 31mm) sawn from its beam junction and snapped at its tapering end (Figure 14.4).

2703 context 473. Tip of a red deer antler tine (L 59mm, W 18mm) which has been worn smooth along its inside edge.

2750 context 582. Red deer antler tine (L 111mm) with four horizontal and two vertical cut-marks at its base.

2751 context 484. Red deer antler tine (L 90mm) which has been whittled at both ends, trimmed at its thicker end and broken off at the other.

2752 context 582. Red deer antler tine (L 100mm) which has been smoothed to a point.

Phase 3

2705 context 319. Tip of a red deer tine (L 92mm, W 15mm) which has been chopped off with two horizontal and two transverse blows.

Phase 4

1673 context 504. Two conjoining fragments of antler tine (L 168mm, D [max.] 23.5mm), though the break is an old one. The tine is smoothed towards the twisted tip with a few cut- or scratch-marks. The opposite end has been roughly hacked and snapped from the beam, and numerous chop-marks are visible.

1940 & 1941 context 127. Two conjoining pieces of antler tine (L 93mm, D 35mm and L 72mm, D 39mm), extending to a junction, forming paired tines. They are roughly broken off with cut-marks encroaching on a fire-blackened area. The tip of 1940 is slightly damaged and there are a few short cuts on one side. The base of 1941 has been sawn and broken off, the clean edge being in a fire-blackened area (Figure 14.4).

2043 context 569. Damaged and worn tine (L 115mm, D 20mm) with irregularly broken base and tip. Towards the tip the tine is smooth and slightly polished through wear, with a few random cuts (Figure 14.4).

2702 context 430. Length of a red deer antler beam (L 178mm, W 28mm) which has been worn flat on one side on an area measuring L 42mm, W 18mm.

2704 context 460. Tip of a red deer tine (L 88mm, W 18mm) which has been chopped off; its inside edge is damaged by six cut-marks.

Phase 5

1075 context 308. Antler tine (L 152mm, D [base] 21mm). The tine is smoothed to a rounded point although traces of the natural striations are visible along the remaining length. The point is polished through wear and displays numerous scratches and irregular short cuts on one slightly flattened face. The base displays many cut-marks and appears to have been crudely hacked and snapped from the beam (Figure 14.4).

1653 context 308. Worn antler tine (L 105mm, D [max.] 23mm), with two angled slices cut from opposing sides of its base, with the cut for a third. These are the remains of several smooth chopping-marks, visible where the tine was removed from the beam, and the third cut-mark is above the cut end. The point of the tine retains its natural striations and appears unworked.

1678 context 507. Length of antler beam (L 126mm, D [max.] 36mm), with an unformed tine offshoot close to a partially sawn break at one end and a jagged end with cut-marks at the other. The piece has two cut-marks at the base and has been snapped from the lower part of the beam. A single tine has also been snapped or broken off.

2726 context 313. Rectangular piece (L 35mm, D 18mm, Th 4mm) of an antler cylinder which has been squared off at either end (Figure 14.4). It is part of a 35mm-long cylinder or sleeve originally *c*. 30mm dia., and 2738 is part of the same artefact.

2738 context 397. Rectangular section (L 35mm, D 23mm, Th 4mm) of an antler cylinder which has been squared off at either end. It is part of a 35mm-long cylinder or sleeve *c*. 30mm dia., and 2726 is part of the same artefact.

Phase 6

1493 context 367. Tip of a tine (L 60mm, D [max.] 15mm), with several parallel cuts towards its broken end and a slice cut from one side. The point of the tine is smoothed and polished and there are a few small cuts to the worn surface as it tapers to the point. The opposite end has a cut flat surface on one edge and several rough hack-marks on one side. It is also broken.

1576 context 367. Beam offcut (L 32mm, D [max.] 26mm), with numerous cuts at various angles, including four serrated teeth. The piece has been roughly hacked and cut on all its surfaces and there are numerous gouges and cut-marks. Along one end three triangular notches have been cut away, leaving a line of four serrated teeth (H 2mm).

1616 context 403. Curved antler tine (L 119mm, D [max.] 28mm), with a smooth surface and a couple of cut-marks at its base. The tine has been smoothed and there is only a faint trace of the natural striations of the antler on the upper surface of the piece. The tip has a slight trace of polish. The opposite end has been snapped from the beam.

Phase 7

1245 context 200. Substantial section of antler tine (L 147mm, D [base] 20mm–33mm). The tine is carved and smoothed towards the tip but the tip itself is broken, obliquely sliced off with a possible notch too irregular to have been intended. At the opposite end there are several cut-marks and the tine appears to have been half cleft and then snapped from the beam. A section of antler has been sliced off the partially sawn base. As the tine tapers, its surface becomes more polished through wear (Figure 14.4).

1250 context 060. Antler tine tip (L 49mm, D [base] 16mm). The tip has been roughly smoothed and displays many scratches and cut-marks. The base has been roughly hacked and snapped and several jagged cut-marks are visible.

1443 context 206. Fragment of compact outer tissue cut from an antler beam (L 55mm, W 28mm). The piece is badly abraded and all the edges are broken. There is a cut-mark and a chop-mark on one edge.

1445 context 205. Antler tine (L 141mm, D [max.] 32mm). The tip of the tine is smoothed and has numerous blunt-

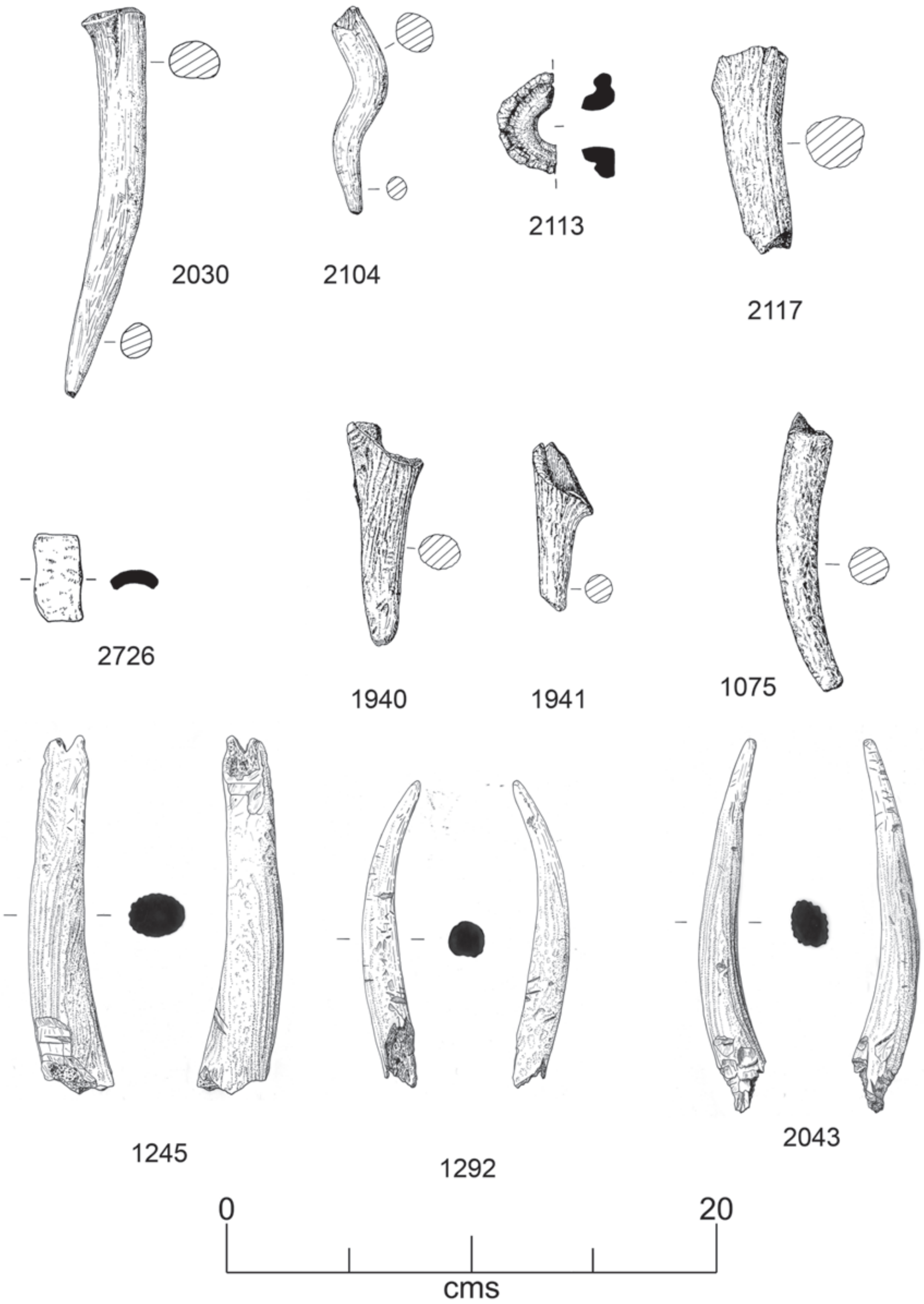

Figure 14.4. Worked antler artefacts

looking cuts or dents and scratches, suggesting that the tine might have been used in a manufacturing process of some description. The opposite end has several cut-marks close to its rather crudely sawn former junction with the beam, where it has been roughly hacked from the beam, and there are numerous cut-marks around the end.

1452 context 214. Beam offcut (L 84mm, D [max.] 26mm), with a rather crudely sawn end, a slice cut from one side and a notch exposing cancellous material, the outer arc of which might have functioned as a crude wedge. The piece is the junction between the beam and the tine. It has been roughly hacked and snapped from the rest of the beam. The tine has also been roughly hacked and

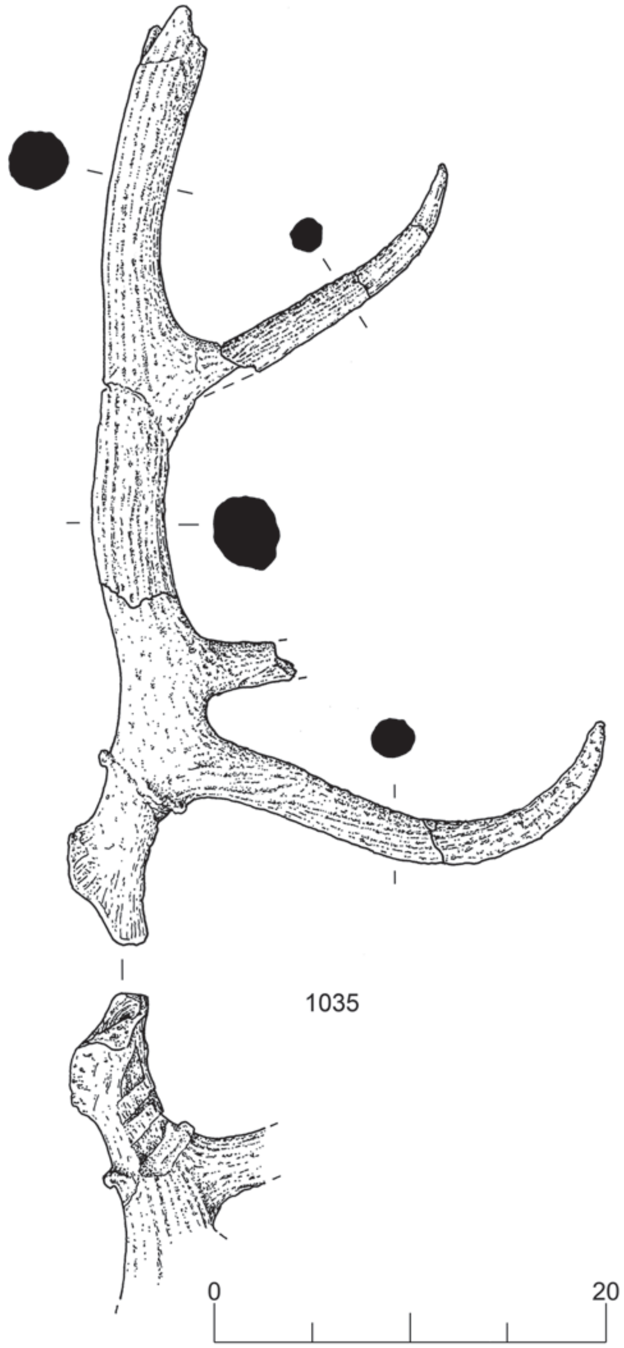

Figure 14.5. A near-complete antler (SF 1035) from phase 8

snapped off. A thin strip has also been roughly cut from one side of the piece.

1469 context 205. Crudely worked antler tine fragment (L 62mm, D [max.] 14mm), with a notched terminal (for attachment?), a sliced side and a damaged tip. The piece has numerous cut and jagged hack-marks or notches along the sides and at the beam end, suggesting that it was used in a manufacturing process. The surface of the antler is otherwise unworked and the natural striations of the antler are visible.

2753 context 204 (sample square 6540). Fragment of red deer antler (L 51mm, W 28mm. Th 1mm–13mm), which has been shaped into the form of a wedge.

2755 context 204 (sample square 6777). Fragment of a rectangular plate of antler (L 29mm, W 12mm, Th 4mm).

Phase 8

1035 context 047. Near-complete red deer antler (L 476mm) but missing the bez tine and crown. The base is attached to the skull, indicating that the antler was not shed but came from a dead animal. Four saw-marks, each about 8mm apart, have detached slivers of antler on the front side at the base of the antler, cutting through the burr. The broken-off edges of the skull where it is attached to the antler are heavily worn and smoothed (Figure 14.5).

1049 context 054. Smoothed antler tine (L 100mm, D [base] 22mm). The tine is in two fragments, probably from an old break which has developed from a deep cut made in antiquity near to the tip; it has also been roughly snapped off at the base which is partially sawn and partially snapped. The piece has been smoothed and polished around the tip and concave side, although some natural striations remain toward the base.

1286 context 034. Antler tine tip (L 26mm, D 12mm). The tip has been smoothed and displays some scratches and a crudely cut end which slices onto the surface of the tine. The opposite end has been roughly hacked and is broken.

1292 context 305. Worked antler tine (L 125mm, D [base] *c*. 22mm). The tine has been worn smooth to a rounded point and has a few fine cuts on its surface, although some traces of the natural striations remain toward the base. The tine appears to have been roughly hacked and snapped from the beam and two cut-marks are visible at the base, with further cuts and wear near the beam junction. The surface of the point is smooth but marked with scratches and cut-marks (Figure 14.4).

2474 context 108. Fragment of shed basal antler from a roe deer (L 27mm, W 22mm), with cut-marks and a sawn-off section identifying this as manufacturing waste.

14.18 Cetacean bone artefacts

The identification of the species from which the whale bone artefacts derive is discussed in Mulville (2002). A range of cetacean species was identified in the artefact assemblage, mostly identified from relatively intact vertebrae, and includes blue whale, sperm whale, killer whale, pilot whale, bottlenose whale and minke whale.

Weaving batten

Unstratified

1029 (Figure 14.6). The blade-like appearance of this

whale bone fragment (L 66mm, W 38mm, D 11mm), with its double-edged sides and blunt point, is typical of a weaving batten or 'sword', used for beating the weft into the warp of a warp-weighted loom (Sjøvold 1974: 249). Such finds made of whale bone have a predominantly north Norwegian distribution, with Sjøvold recording 72 examples (*ibid*.: 249).

In 1805 reference was made to 'swords made of the bone of a large fish' from the Pierowall graves on Westray (Barry 1805: 206), and further examples of whale bone weaving battens from Norse contexts on Orkney have recently been identified from Skaill in Deerness (Anne Brundle pers. comm.) and Quoygrew–Nether Trenabie (Discovery and Excavation in Scotland 2005: 102; Barrett 2012). A further comparable whale bone weaving batten was recovered from the destruction level of a twelfth-century house at Wallingford, Oxfordshire (MacGregor 1985: 188, fig. 101.13).

Such whale bone battens were still present in west Norwegian farms in the late nineteenth century and were used in the Faroes until the recent past (Sjøvold 1974: 252), making dating this blade tip from a mixed context problematic. However, it comes from Cille Pheadair's surface layers (mostly phases 7–9) and was thus deposited late in the site's occupation.

Chopping-blocks

Phase 4

2694 context 422. Block of whale bone (L 213mm, W 101mm, Th 70mm), punctured with 11 holes on one side and three holes, a large hole (composed of at least seven holes) and over a dozen cut-marks on the other side. The holes range in diameter from 5mm to 15mm (Figure 14.6).

Phase 6

1464 context 367. Block of whale bone (L 234mm, W 144mm, Th 79mm), the greater part of a sperm whale's thoracic vertebra, with 14 cut-marks on one side and at least 21 cut-marks on the other. The cut-marks range in length from 9m to 53mm.

Phase 8 (unstratified)

1037 (E 10.8, N 101.18). Whale vertebra (L 130mm, W 120mm, Th 120mm). The random cuts at both ends represent more than butchering, and indicate that this modified vertebra was used as a small chopping-block. The worn-away surface of the natural hollow at one end of the vertebra suggests that it might also have functioned as a mortar (Figure 14.6).

Unfused whale bone vertebrae have been used for various functions, with large hollowed-out examples identified as vessels at the Sollas wheelhouse, North Uist (Campbell 1991: 133, 158). There are fragments of seven hollowed-out examples from Foshigarry (Hallén 1994: 219), and some modified examples from A'Cheardach Mhor were identified as 'post-bases' (Young and Richardson 1960: 142). SF 1037 was found just outside the entrance of Outhouse 006 within the windblown sand covering the site, and probably belongs to phase 8, a period of activity dating to the early twelfth century.

Scutching tool

Phase 6

1585 context 350. Piece of a bat-shaped whale bone object (L 194mm, W 76mm, Th 7mm–19mm). Its lower, slightly convex edge is indented with short, blunt 'teeth' separated by substantial semi-circular indentations. The surviving side is slightly rounded, and its curved upper shoulder appears to have led into an integral handle. The upper, slightly dished, smooth surface of the bat has distinctive, vertically-aligned wear patterns, cut by a few transverse scratches. This contrasts with its back, which is of rough, unworked cancellous bone, with much of the original surface apparently having sheared off, reducing its depth towards the centre by approximately half (Figure 14.6).

The shape of this implement is not unlike that of the Viking-Age 'cleavers' with their integral handles, though its serrated edge indicates a different function. It is identified as a possible scutching tool, used in conjunction with a board, in separating unwanted plant matter from the fibres of plants such as flax, hemp and nettle for textile production (Hoffmann 1991: 56–8). A smooth-edged scutching tool used in the processing of flax was recovered from Coppergate, York (Walton Rogers 1997: 1725–7, fig. 798.6644). Closer parallels to the Cille Pheadair example with traces of serrated edges have been excavated from Mound 1, Bornais (Sharples 2012b: 145, 277, fig. 89) and Paible, Taransay (1357 NG 032991).

Beater or paddle

Phase 7

1586 context 205. Cricket bat-shaped whale bone object, complete except for its snapped-off handle (L 285mm, W 118mm, Th 20mm; handle W 22mm, Th 20mm). The paddle is made from the end of the rib of a large cetacean, providing it with a slightly curved profile with a concave face on one side and a convex one on the other; its distal end is the otherwise unmodified end of the rib, later dented in two places. The distal end has been thinned asymmetrically towards the base of a handle by two heavy, angled chop-marks. The gap between these two ends is the base of the handle, which has snapped to leave just its 15mm-long stump. The paddle has no distinct wear-patterns but is dented on its convex side by five, parallel indentations (L 8mm–10mm) towards the proximal end and a single indentation (L 16mm, W 1.5mm) at an angle near the distal end (Figure 14.7).

Perforated toothed plate

Phase 4

1848 context 539. Large worked fragment of cetacean bone which is composed of eight recently reassembled

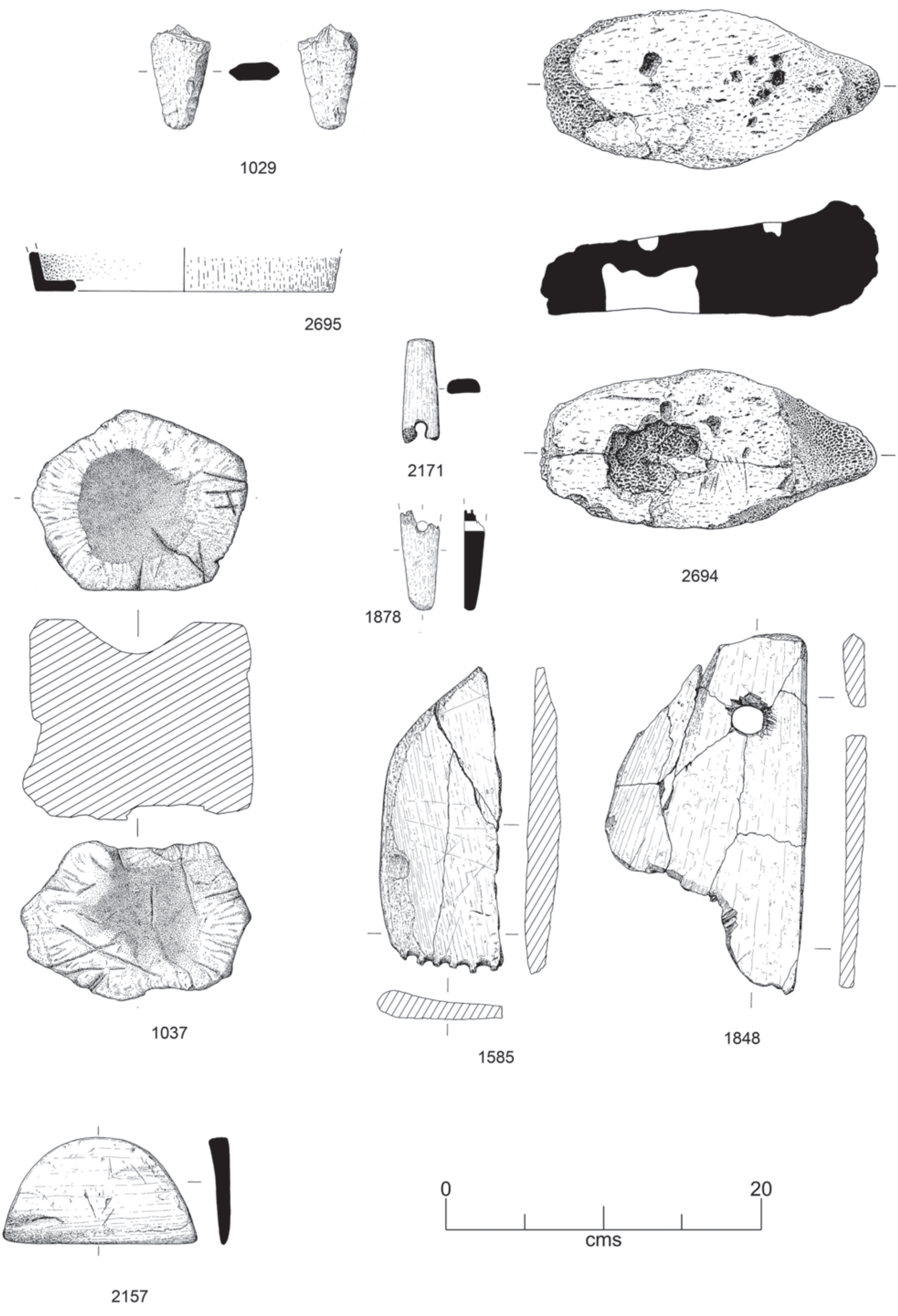

Figure 14.6. Whale bone artefacts including a scraper/cleaver

fragments (L 228mm, W 128mm, Th 14mm). It is made from the mandible of one of the Balaenoptera. Its one long, slightly bowed straight edge is at right-angles to what appears to have been a similarly chamfered edge, now damaged. Just in from this right-angled corner is a substantial perforation (D *c.* 20mm). Approximately half of the perforated edge retains its original smooth surface, with the remainder having been deeply cut into. The upper surface of the plate is relatively flat and smooth, though there is a deep groove just to one side of the perforation. The irregularly fashioned edge displays burnt patches in addition to transverse cuts, but is worn smooth in places. This irregular edge may be a secondary reworking of the original object. The back of the plate is rough, unworked cancellous bone (Figure 14.6).

The function of this perforated plate of cetacean bone is difficult to determine. It might originally have formed the lower corner of an unusually large line-winding 'fork'. These are rare finds, with only three known examples from northern Norway (Sjøvold 1974: 260). The undecorated fork from a ninth-century male boat grave from Mo, Brönnöy (*ibid*.: pl. 64a), although considerably smaller, appears to have similarly chamfered edges with a perforation likewise positioned close to one corner. It has been suggested that such 'forks' were used when fishing with hand-lines, with the line being wound around the teeth and the hook fastened in the perforation when not in use. It is possible that the Cille Pheadair example's teeth broke and, in their absence, the line was wound to one side of the perforation, creating the worn groove in this area, and a substantial hook may account for the deep cuts to one side of the perforation.

'Cleaver' or scraper

Phase 1

2157 context 590. Cetacean bone 'cleaver' or scraper of half-moon shape (H 67mm, W 124mm, Th 12mm; Figure 14.6). It is made from the mandible of one of the Balaenoptera. This object's size and semi-circular form identify it with a small group of cetacean bone objects found predominantly in northern Norway, where Sjøvold recorded 13 examples (1974: 257). Three of the above finds were recovered from female graves with impressive assemblages of textile implements (Petersen 1951: 341–4). This suggests that these cetacean bone artefacts were associated with a task performed by women, possibly associated with clothing production. Although identified in the literature as 'cleavers', Petersen's suggestion that they might have been used in the tanning process (*ibid*.: 344) seems more plausible, particularly as the polished rounded blade-edge of the Cille Pheadair example is more suggestive of having performed a scraping function rather than the chopping action associated with a cleaver.

The Cille Pheadair 'blade' differs from the above parallels in that it has no handle nor a socket for one. Pre-Viking examples were socketed, presumably with a wooden handle, but all seven of the Viking-Age examples known to Petersen were carved with an integral handle (*ibid*.: 341). The semi-circular form of the Cille Pheadair blade, which was the most prevalent pre-Viking form, is found with an integral handle in a late ninth-century Norwegian context (Sjøvold 1974: 258), showing the weakness in developing a typology based on such a small data-set. On balance it seems likely that the Cille Pheadair blade is contemporary with the Norwegian Viking-Age parallels and, although hand-held, probably performed a similar function. A rather crude 'cleaver'/scraper with integral handle was recovered from the Viking Age settlement at Drimore, South Uist (MacLaren 1974: pl. 2.39), and a decorated spade-shaped example came from Dublin (O'Riordáin 1976: pl. 15).

Clamps

Two different types of clamp have been identified at Cille Pheadair. Such clamps could have been used in manufacturing a variety of light materials, with making combs being one possibility, although there is no contextual evidence to prove this (MacGregor 1985: 172). This type of clamp is well known in Scandinavia (MacGregor *et al*. 1999: 1997) and Hedeby in particular (Ulbricht 1978: 44–5). Several clamps have been recovered from Dublin, from Christchurch Place in particular (Mann 1982: 32 ff, 41) where there is considerable evidence for both comb-making and metalworking.

Within Scotland similarly shaped objects have been recovered from Drimore (MacLaren 1974: 18, no. 40), Freswick (Curle 1939: 99, pl. XLIX.1) and Jarlshof (Curle 1935: 293, fig. 23), where they have been identified as snecks rather than clamps on account of circular wear on the underside of the perforation.

Phase 1

2171 context 760. Fragmentary worn element of a two-piece clamp of whale bone (L 66mm, W 23mm, Th 9mm). The base is flat with a slight upturn at one end. It tapers away from the broken perforation (D 8mm) to a squared-off terminal. Its cross-section is sub-rectangular. This fragment is almost certainly part of a two-piece clamp of the type formed by matching pairs which, when riveted together with the flat sides facing, are contiguous at one end and divergent at the other (Figure 14.6).

Phase 4

1878 context 430. Fragment of a clamp made from whale bone (L 62mm, W 24mm, Th 12mm). One end is asymmetrically rounded and worn. The opposite end is pierced with a hole (D 9mm), and has broken along the line of the perforation. It has a flat base and is of semi-circular section. The upper edge has also been smoothed and is convex. This fragment is almost certainly part of a two-piece clamp of the type formed by matching pairs which, when riveted together with the flat sides facing, are contiguous at one end and divergent at the other (Figure 14.6).

Cetacean bone dishes

Phase 4

1770 context 430. Almost half of a dish or circular platter made from a large cetacean's vertebral plate which has been shaped on one side to form a circular trough with gently sloping sides (L 235mm, W 120mm, Th 8mm–18mm). This is part of a vessel originally 380mm dia. (Figure 14.7).

Phase 5

2695 context 313. Fragment of a dish made from a whale bone (W 40mm, H 25mm, Dpth 28mm). This is part of a vessel originally 200mm dia. and 25mm high, with walls 5mm thick (Figure 14.6).

Cetacean vertebral lids

There are three such lids from Cille Pheadair. One (SF 2163) has signs of burning, suggesting its use in cooking, whilst SF 1984 has sooting marks. The smallest is SF 2044. Slightly smaller perforated bone discs have been recovered from the Broch of Burrian (MacGregor 1974: fig. 10.147–8, 80) and Jarlshof (Small *et al*. 1973: 122, fig. 42), where they have been respectively identified as weaving tablets and dress- or girdle-fasteners. Both such identifications seem unlikely for SF 2044 which, unlike these Northern Isles examples, displays only a single perforation with no signs of wear. The use of these three items as pot-lids is most likely, a similar function being ascribed to cetacean vertebral epiphyses from Gurness (Hedges 1987: 207), Foshigarry (Hallén 1994: 217–19) and Quoygrew (Barrett 2012).

Phase 1

2163 context 723. Unfused cetacean vertebral epiphysis (D 230mm, Th 27mm) with a central perforation (D 20mm). There are few signs of wear around the central perforation, but the outer circumference is chipped and burnt in places; there are also signs of burning on the object's underside. It is likely that this vertebral epiphysis was adapted for use as a lid, the signs of burning suggesting that it was associated with a large cooking vessel (Figure 14.8).

Phase 2

2044 context 457. Unfused cetacean vertebral epiphysis (D 41mm, Th 5mm) with a central perforation (D 4mm) and a clearly cut outer circumference. It is possible that this disc functioned as a lid for a small vessel (Figure 14.8).

Phase 5

1984 context 530. Unfused cetacean vertebral epiphysis (D 66mm, Th 7mm) with a central perforation and three radial perforations (D *c.* 5mm) positioned approximately equidistantly and close to its circumference. The outer edge is worn, with loss of much of the original surface. This object might have functioned as a lid; such an identification is supported by the presence of soot on both the circumference and underside of this piece (Figure 14.8).

Pegs

Phase 4

2712 context 504 (sample square 7181). The smoothed and squared terminal of a whale bone peg or bar (L 22mm, W 12mm, Th 6mm) which has been chopped at and cut off from the rest of the artefact in antiquity (Figure 14.8).

Phase 7

2757 context 205 (sample square 6670). Fragment of a carved rectangular peg or strip (L 22mm, W 15mm, Th 5mm) of whale bone.

Miscellaneous worked cetacean bone and artefacts, and an ivory artefact

The worked cetacean bone fragments may be manufacturing waste or butchery waste. For the quantity and distribution of unworked fragments of cetacean bone, see Chapter 18.

Among the miscellaneous cetacean bone artefacts from Cille Pheadair, there is a single fragment of an ivory object. No ivory was recovered from nearby Bornais Mounds 1 or 3 but there is a small assemblage from Mounds 2/2a (Sharples forthcoming). Elsewhere on South Uist, ivory was retrieved from Late Bronze Age and Early Iron Age layers at Cill Donnain, which produced an ivory pin and a worked marine mammal (walrus?) tooth (Parker Pearson and Zvelebil 2014: 145, 147–8).

Phase 2

2527 context 618. Fragment of ivory (L 26mm, W 6mm, Th 14mm) with only a small portion (L 17mm, W 4mm) of the original artefact's surface remaining.

2101 context 618. Fused thoracic vertebra (L 154mm, W 105mm, Th 61mm) from a large cetacean, detached from the side of the vertebral cylinder to give the appearance of a shaft-hole axe-head. The blade is heavily abraded from use but there is no sign of any wear caused by a putative handle on the inside edges of the natural shaft-hole. This might have been a digging tool or child's toy (Figure 14.7).

Phase 3

2020 context 464. Fused thoracic vertebra (L 296mm, W 110mm, Th 95mm) of a killer whale. Three of its four wings have been broken off to give it the appearance of a mallet. It has been damaged on both of its flat sides, one more extensively than the other, with flakes of bone removed around the edges to expose the cancellous interior. If this implement was used as a mallet, then it was applied to soft materials since there are no dents on the surfaces of either flat side. The flakes of bone might have been detached by percussive action.

2154 context 701 (sample square 7564). Largely complete, fused thoracic vertebra of a pilot whale. Most of the surface on both flat sides of the disc has been removed to expose the cancellous bone. These opposed surfaces

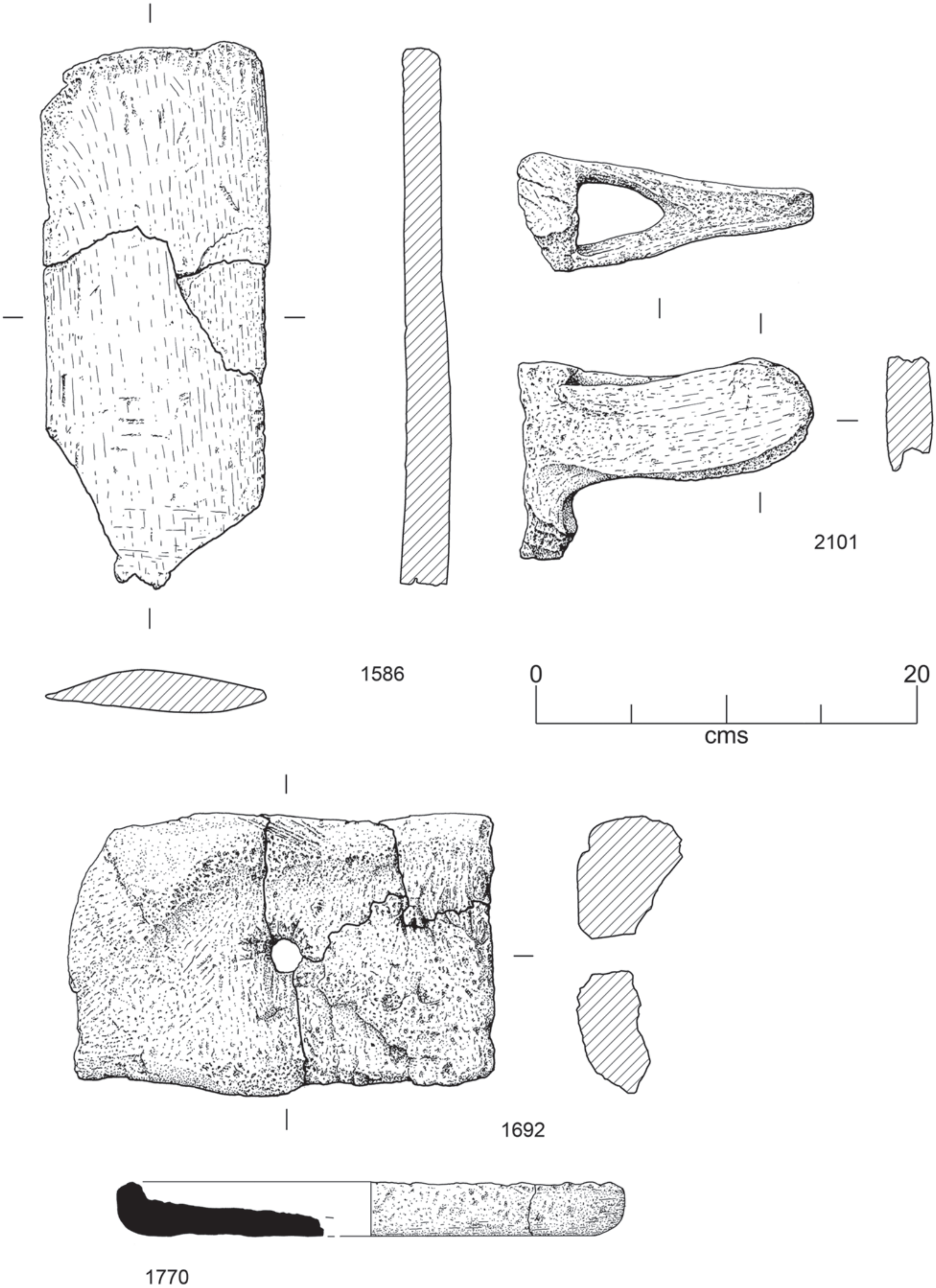

Figure 14.7. A beater/paddle and other whale bone artefacts

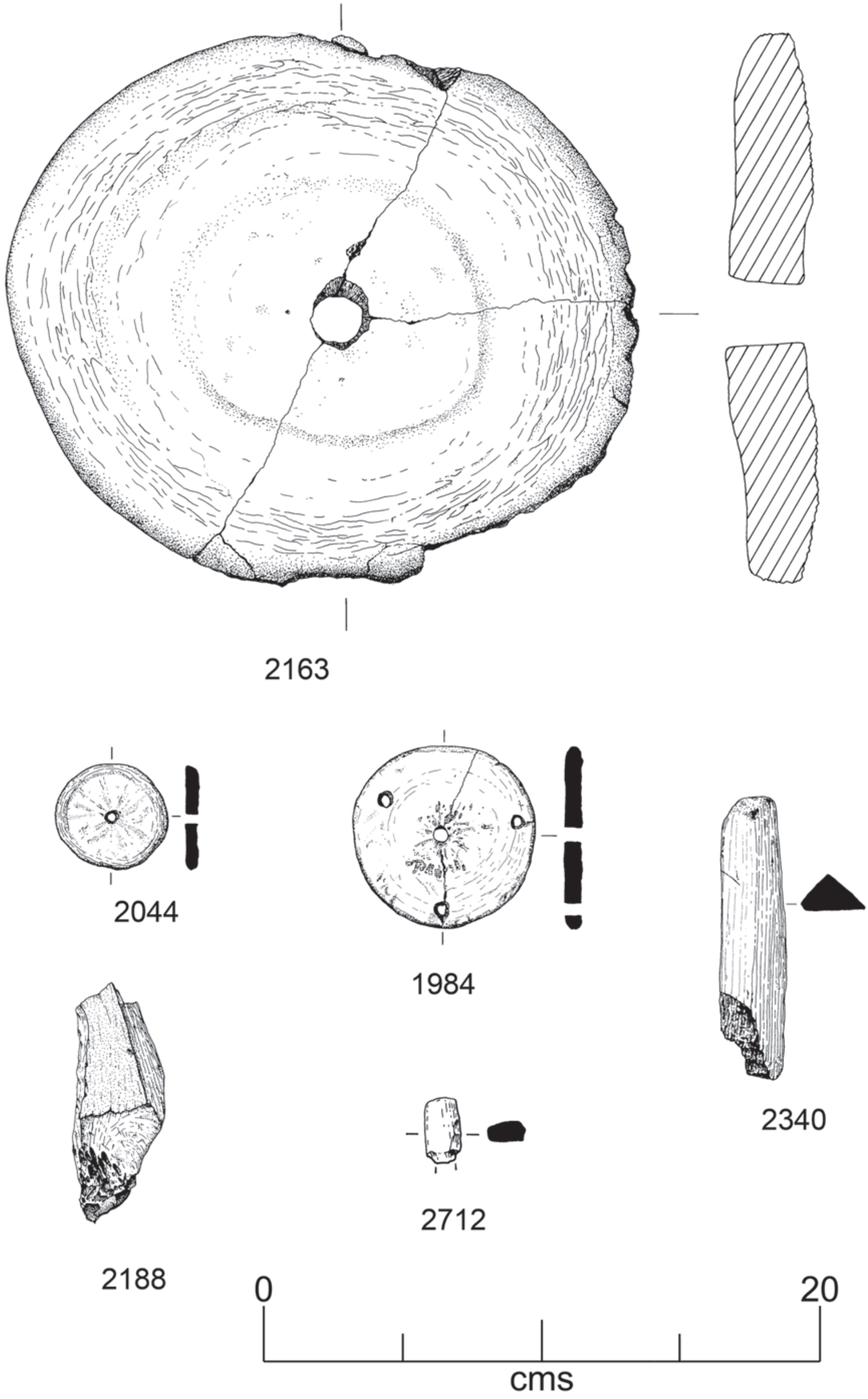

Figure 14.8. Utilized whale bone vertebral discs and other artefacts

have been pierced by a circular hole (D 17mm) slightly off-centre.

Phase 4

1670 context 504. Atlas of a bottle-nosed whale, pierced with a circular hole (D 23mm, Dpth 57mm) into the narrower of the two vertebral surfaces. There is a snapped-off mammal bone (species unknown) lodged in the hole. The atlas bone is heavily weathered and abraded, with cancellous bone exposed especially on its vertical sides. There are traces of localized burning at three locations around the lower sides of the vertebra. It might have been used as the base of a stand or the socket for a pintle (but is not large enough for a door pivot; Figure 14.9).

2062 context 569. Rib of a small cetacean (L 204mm, W 20mm, Th 15mm), whittled at one end to a point. The trimming marks are visible up to 73mm from the point, and the bone has the appearance of an antler tine.

2188 context 504. Fragment of cut whale bone (L 43mm, W 16mm) with copper-alloy staining on its outer face (Figure 14.8; also listed in Chapter 13.14, 'Miscellaneous copper artefacts').

Context 317. Small chip of cetacean bone, possibly worked.

Context 370. Unfused thoracic vertebra of a minke whale, with the centre of one of its two flat sides partially and crudely hollowed out with a blade to form an irregular depression (L 64mm, W 41mm, Dpth 26mm).

Phase 5

1824 context 397. Strip of compact cetacean tissue (L 56mm, W 20mm, Th 7mm), of flat section, rough on one face, but with a smooth, slightly ridged surface on the other. One narrow end is sawn at an angle, whilst the other is broken away.

1831 context 219. Length of large cetacean rib (L 403mm, W 92mm, Th 29mm). One end appears to have been roughly squared off. The upper, smooth surface is punctured by 43 small dents (L 2mm–10mm). The back is of rough, unworked cancellous bone, where the rib has been split longitudinally.

1679 context 507. Unfused cetacean vertebra (D 208mm, Th 92mm), originally drilled through its centre with a circular hole (D 27mm). The vertebra has subsequently split across its middle, leaving half of the hole in cross-section. There are six cut-marks (L up to 36mm) radiating approximately from the edges of the hole on one flat side.

1692 context 522. Large cetacean's vertebra, worked into a rough-surfaced, rectangular plaque (L 214mm, W 145mm, Th 61mm), drilled through with a central circular hole (D 21mm). One flat side has been cut down to expose cancellous bone but the other is largely unmodified except for lines of cut-marks emanating from the central hole and a few other cut-marks elsewhere on the surface. There are also about 12 cut-marks (L up to 45mm) on one of the plaque's edges (Figure 14.7).

Context 533. Small fragment of worked cetacean bone.

Phase 6

1400 context 341. Fragment of cetacean bone (L 55mm, W 43mm, Dpth 21mm), with the depth between its upper and lower original surfaces indicating that it might have been cut from near the centre of a large unfused vertebral epiphysis. The piece is sub-rectangular and has possibly been cut on two edges. The other two edges are badly abraded. There is no indication as to its function, but one straight edge suggests that it is an offcut.

1416 context 350. Unfused vertebra of a large cetacean, whose sides have been crudely worked and hacked to form a shape like an elephant's foot, expanded at the bottom and narrowing upwards (L 212mm, W 151mm, H 139mm). Its upper part is badly damaged but there appear to have been two depressions, both 60mm deep, *c.* 20mm dia. and 10mm apart, cut off-centre. One of these is angled (although this may be due to later damage). There are deep vertical cut-marks (L up to 70mm) on one vertical side that have probably been made with an axe. This might have been the base of a stand or sockets for a pair of small pintles. Its context within the cobbles of an outdoor working floor may be significant for understanding its original purpose. The scutching tool (SF 1585) also came this outdoor working floor.

1483 context 374. Implement of cetacean bone (L 83mm, W 91mm, Th 39mm), formed from a vertebral process. It is sub-rounded with an elongated length of bone jutting from its upper surface. There is a natural groove in the upper edge of the process, but an incomplete man-made perforation at its base. This hole is 14mm dia. and the piece has broken across the line of this hole. The surfaces of the piece are badly abraded.

1487 context 365. The unfused proximal epiphysis of the humerus of a blue whale. It is unmodified except for three possible cut-marks on its underside. This large bone (L 305mm, W 205mm, Th 210mm) was incorporated into the crude stone wall of a small shed.

1581 context 367. Pointed implement of cancellous cetacean bone (L 344mm, W 98mm, Th 38mm), broken in half. The distal end terminates in a blunted point, slightly convex on one of its flat sides. Near the point, one edge has a line of transverse dents, probably cut-marks. About six cut-marks are also visible on the concave surface towards the proximal end, where there are three deep cut-marks (L up to 38mm) into its proximal end.

1587 context 341. Fragment of a vertebral epiphysis (L 10mm, W 5mm, Th deep) of a large cetacean, with evidence

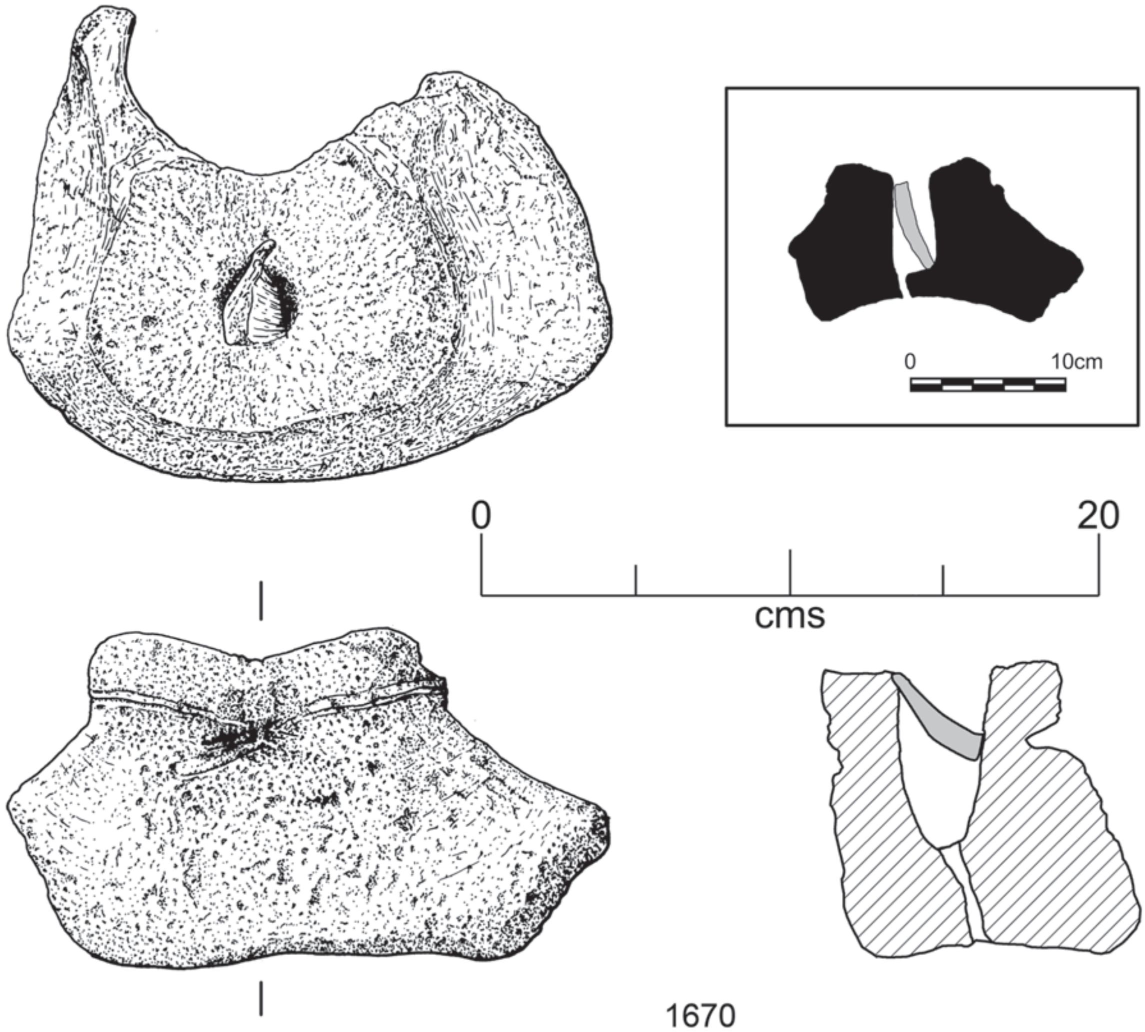

Figure 14.9. A utilized whale bone vertebra (SF 1670) with a mammal bone fragment jammed in it

for burning along one broken edge and two deep dents on one of its two flat surfaces.

Phase 7

1056 context 303. Section of whale otolith (L 85mm, W 50mm, Th 37mm), with cuts. The piece has been roughly hacked along at least two edges. The inside of the upper face has a natural, smooth surface. The outside surface on two sides displays a distinctive plated structure.

2340 context 205 (sample square 6684). Worked fragment of cetacean bone (L 52mm, W [original] 9mm), with traces of three original faces. One long edge is straight and the other slightly tapered, terminating in a worn, flat end. The piece has a triangular cross-section. This fragment appears to have sheered off from the side of a larger artefact, such as a plaque, a handle or even a clamp (Figure 14.8).

2756 context 204 (sample square 6777). Fragment of trimmed whale bone (L 20mm, W 15mm, Th 6mm).

Context 060 (sample square 6095). Small fragment of worked cetacean bone.

Context 327. Among the 14 small fragments of cetacean bone from this context are two that have modified surfaces.

Phase 8

Context 054. Two small fragments of worked cetacean bone.

Phase 9

Context 013. Length of whale rib (L 320mm, W 104mm, Th 26mm). The upper, smooth surface is marked by two angled cut-marks (L 40mm). The back is of rough, unworked cancellous bone, where the rib has been split longitudinally.

Context 026. Small fragment of worked cetacean bone.

Unstratified

Fragment of a wedge-sectioned artefact of compact cetacean tissue (L 100mm, W 29mm, Th 19mm), smooth

on both faces, with a gently curving sawn edge meeting a steeply concave edge sawn in a series of steps. It might have been part of a paddle or beater.

14.19 Worked marine shell

A single example of a worked shell was found at Cille Pheadair. Perforated marine shells were found in the Late Iron Age deposits at Bornais Mound 1 (Sharples 2012: 262, fig. 166), but not in the Norse levels at Bornais. Sharples (*ibid.*: 366) points out how easily such perforated shells may be missed during excavation on any site on which marine shells occur in copious numbers, since shells are usually swiftly discarded during excavation. However, the extremely large number of shells examined from Norse-period Mound 3 at Bornais (Sharples 2005: tab. 77) produced no worked shells.

Phase 5

2792 context 503 (sample square 6959). Limpet shell with a rectangular slot (L 13mm, W 1.5mm) cut through its apex.

15 The iron knives, tools and weapons

M. Parker Pearson

15.1 Overview of the quantity and range of the iron artefacts

There is a moderately large assemblage of 969 iron objects from Cille Pheadair, just over a third of all the recorded small finds (Tables 15.1–15.3). In addition, a further 11 dress fittings and ornaments – pins, rings, *etc.* – are catalogued and discussed in Chapter 13.16 'Iron ornaments'.

The most numerous types of artefact are:

- nails and nail fragments (*n*=356),
- clench nails and roves from boats (*n*=316),
- a variety of fittings (*n*=52),
- plate fragments (*n*=50),
- strips and bars (*n*=41),
- unidentifiable fragments (*n*=78).

The assemblage contains a wide range of recognizable artefacts and artefactual fragments:

- ornaments (*n*=11; see Chapter 13),
- knives (*n*=at least 12, probably 16),
- chisels and gouges (*n*=5),
- a wedge (*n*=1),
- tools for working textiles and leather (*n*=28),
- agricultural tools (*n*=5),
- other tools (*n*=6),
- arrowheads (*n*=3, possibly 4),
- cauldrons and other cooking utensils (*n*=11).

This assemblage consists of items used for a wide range of activities, both outdoors on land and sea and in the home. Many of them might have been made and/or repaired within the farm's smithy that lay probably just beyond the eastern edge of the excavation (on the basis of the distribution of ironworking slag and hammerscale; see Chapter 17). Further evidence for ironworking at Cille Pheadair comes from finds of prepared but unused strips of roves for clench nails used in boat-building and repair.

The clench nails or boat nails provide an interesting perspective on the maritime aspects of daily life – the likely size and nature of the boats – to complement the findings from the fish bone analysis (see Chapter 19). The other iron equipment sheds light on the range and nature of farming activities to complement the analyses of animal bones (see Chapter 18) and carbonized plant remains (see Chapter 21).

15.2 Knives

The Cille Pheadair assemblage contains:

- 12 knives,
- four probable knife fragments,
- seven knife tangs or tapered strips that may be broken tangs (but could be nails or might belong to other tanged artefacts; Table 15.4).

Three of the knives are complete and two are missing only the tip of their tang or their blade. All of the knives and knife fragments have whittle tangs, in which the tang is forged as part of the knife (although two strips have a rivet or rivet hole at one end and could conceivably be scale tangs). Only the 16 certain knives are listed as such in Table 15.1. Artefacts not definitively identified as knives but which are possibly knife fragments can be found listed in this chapter as 'Other possible tools', 'Arrowheads', 'Riveted strips', and 'Strips and bars'.

Of the seven knives whose back form could be identified, Ottaway's types B, C1, C3, D and E are represented, with B being the most common (1992: 558–85). The total length of the complete and near-complete knives ranges from 58mm to just over 110mm (average 75.8mm from five examples). Their blade length lies between 38mm and 106mm (average 60.5mm from six examples). The ratio of knife length to blade length is 1.26:1. Blade widths range from 10mm to 25mm (average 15.4mm from nine examples) and form a bimodal distribution, with six at 10mm–13mm and three at 22mm–25mm wide.

There is no significant chronological distribution of knife types. Remains of knifes and possible knives are most common in phases 4 and 5; this is not surprising given the

Table 15.1. Distribution of all iron artefacts by phase

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8	Phase 9	U/S	Total
Knives	1	3	1	5	4		2				**16**
Chisels & gouges			1		2	1	1				**5**
Wedge				1							**1**
Heckle/comb	1		1	3	6		1				**12**
Needles	1	1		2	5		3	2			**14**
Awls							2				**2**
Agricultural tools	2	1			1		1				**5**
Miscellaneous tools			1		5						**6**
Arrowheads					1	2	1				**4**
Cauldrons & large bowls	2	1	1		3						**7**
Cylinders & tubes		1		3							**4**
Clench nails	5	14	13	23	45	9	28	9		1	**147**
Roves	19	16	24	34	33	5	28	9		1	**169**
Handles, mounts & hinges	1				1			1			**3**
Pierced fittings		1	2	2	7		1				**13**
Unpierced fittings	1	1	1	2							**5**
Riveted fittings	3	4	2	2	10	1					**22**
Rivets & studs					1		1				**2**
Clench fastening				1			2				**3**
Edge binding			1								**1**
Clasps			1	1							**2**
Loops				1							**1**
Nails	30	21	48	78	93	15	47	14	4	6	**356**
Strips & bars	2	3	2	10	15	3	2	3	1		**41**
Plates		3	11	15	15	2	3	1			**50**
Unidentifiable	8	7	15	14	15	7	7	2	3		**78**
Total	**76**	**77**	**125**	**197**	**262**	**45**	**130**	**41**	**8**	**8**	**969**

large sizes of the ironwork assemblages in those phases. In terms of quantities of ironwork in each phase, knives are over-represented in phase 2 which has three knives among just 77 iron items.

The assemblage is too small to warrant a detailed examination of manufacturing techniques and composition, which is better carried out within the context of a study encompassing assemblages from the Western Isles more broadly. All of the knives were selected for long-term conservation.

Since the assemblage is small, any generalizations need to be treated with care. Nonetheless, there are some interesting observations. The complete absence of back form A – the angle-backed knife so common throughout England in this period – is interesting but probably not significant given that this form is known from Bornais Mound 3 (Sharples 2005: fig. 56.1887). Two type-D knives were recovered from the Norse deposits within Bornais Mound 1 (Sharples 2012b: 279, fig.182.1096, 1539).

The dimensions of average length and blade length are

Table 15.2. Distribution of complete iron artefacts by context type and by phase

Phase 1	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Nails	1							
Clench nails	1							
Phase 2	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Nails			1					
Clench nails						2		
Weights			1					
Phase 3	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Tools					1			
Fittings	1							
Nails	2					2		
Clench nails					1	2		
Strips					1			
Phase 4	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Knives			1			1		
Dress fittings					1	2		
Fittings					1	2		
Nails		1	1			1		
Clench nails		3	1		3			
Strips						1		
Phase 5	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Knives			1					
Tools			1					
Dress fittings						1		
Fittings						2		
Nails		3	1			2		
Clench nails		4				5		
Weights		1				1		
Strips		1				3		
Plates						2		
Phase 6	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Arrowheads				1		1		
Tools		1						
Clench nails								1
Strips		1						
Phase 7	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Arrowheads				1				
Knives					2			
Tools		1	1					
Fittings						1		
Nails						1		
Clench nails			1			4		
Rove strips			1					
Strips		1						

Table 15.2. continued

Phase 8	*Sandbank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*
Nails					1			
Clench nails		2						
Rove strips		1						

Table 15.3. Distribution of all iron artefacts by context type and by phase

Phase 1	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Knives							1		
Textile tools	1	1							
Other tools									2
Containers									2
Fittings	1								3
Nails	15								15
Clench nails	1								4
Roves	3								15
Strips	1								1
Unidentifiable	5								3
Phase 2	*Above sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Knives	1	2							
Textile tools		1							
Other tools							1		
Containers		2				2			
Fittings						4	2		1
Nails	1	9				3	8		
Clench nails	1	10				2	1		
Roves	1	9				4	1		2
Strips							3		
Plates		1				1	1		
Unidentifiable		1				5	1		
Phase 3	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Dress fittings					1				
Knives						1			
Textile tools	1								
Woodwork					1				
Other tools	1								
Containers						1			
Fittings	1			1	2	3			
Nails	7	8		2	12	19			
Clench nails	1			2	3	7			
Roves	3			4	2	15			

Table 15.3. continued

Strips					1	2			
Plates	1			1	8	1			
Unidentifiable	1	1			5	8			
Phase 4	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Dress fittings					2	3			
Knives			1		1	3			
Textile tools					4	1			
Other tools					1				
Containers			2			1			
Fittings			1		4	4			
Nails		17	7	2	28	23			1
Clench nails		2	3		12	6			
Roves		1	10		14	10			
Strips			1			8			
Plates		1	3	1	4	6			
Unidentifiable		3			6	4			
Phase 5	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Dress fittings						1			
Arrowheads		1							
Knives		2	1			1			
Textile tools		6	2			3			
Woodwork		1		1					
Other tools		3				3			
Containers						3			
Fittings		7	1	3		7		1	
Nails		41			1	48	2		
Clench nails		17			1	22		4	
Roves		14	1			16		1	
Strips		4	1	3		6			
Plates		1		3		11			
Unidentifiable		6		1		10			
Phase 6	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Arrowheads				1		1			
Woodwork		1							
Fittings		1							
Nails		9		1	2	1		2	
Clench nails		7						2	
Roves		2			2			1	
Strips		2				1			
Plates		1			1				
Unidentifiable		4				2		1	

Table 15.3. continued

Phase 7	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Dress fittings					1				
Arrowheads			1						
Knives					2				
Textile tools					3	1			
Woodwork			1						
Other tools		2							
Fittings						1			
Nails		20	4		13	10			
Clench nails		14	3		1	10			
Roves		5	6		4	12			
Strips			1		1				
Plates			1		2				
Unidentifiable		2			4	1			
Phase 8	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Textile tools		1			1				
Containers		1							
Fittings			1						
Nails		11			3				
Clench nails		9							
Roves		6	1		2				
Strips					3				
Plates					1				
Unidentifiable		2							
Phase 9	*Sand bank*	*Fill*	*Construction*	*Wall*	*Floor*	*Midden*	*Organic layer*	*Surface (outdoor)*	*Pit*
Dress fittings					1				
Nails		3			1				
Strips									1
Unidentifiable		1		1	1				

Table 15.4. Knife types by phase

Phase	**A**	**B**	**C1**	**C2**	**C3**	**D**	**E**	**Unident.**	**Probable**	**Tapered strip or tang**
1									1	
2								2	1	
3								1		1
4		2			1			2		1
5		1				1			2	3
6										
7			1				1			
8										2
9										

37mm–44mm and 6mm–11mm shorter than for medieval and Anglo-Scandinavian York (Ottaway and Rogers 2002: 2760). This might be explained by a higher priority on recycling at Cille Pheadair, resulting in only the smaller items and fragments being discarded here. Tangs are also short at Cille Pheadair since the length/blade length ratio at York for both periods is 1.77:1 (*ibid.*). Conversely, blade widths are greater at Cille Pheadair since the average widths of the York assemblage are 12.78mm and 14.13mm. Overall, the Cille Pheadair assemblage can be characterized as being short, small and wide.

Catalogue

Phase 1

2315 context 607. Incomplete tapered strip (L 15mm, W 4–12mm, Th 2mm), probably the tip of a knife.

Phase 2

2308 context 582. Broken-off and tapered tang (L 48mm, W 3–11mm, Th 4mm).

2348 context 453. Knife with an incomplete blade of unknown blade back form (overall L 48mm with a tang L 33mm). The blade is 11mm wide.

2515 context 582 (sample square 7497). The tip of a knife blade, possibly of blade back form C1 (L 30mm, W 15mm).

Phase 3

1736 context 319. Broken-off tang (L 54mm, W 5mm, Th 5mm) slightly curved and terminating at a 3mm-wide edge.

Phase 4

1696 context 422. Possibly the convex back of an incomplete knife (L 55mm, W 8mm; Figure 15.1).

1755 context 430. Knife of back form C3 (overall L 81mm), with a well-worn blade (L 50mm, W 12mm wide; Figure 15.1).

1994 context 548. Small knife with an incomplete blade of unknown blade back form (overall L 79mm, tang L 29mm). The blade is 22mm wide.

2058 context 553. Knife of blade back form B (overall L 110mm, blade L 82mm, W 12mm) which is missing the tip of its tang (Figure 15.1).

2403 context 430. Incomplete knife blade of blade back form B (L 55mm, W 12mm).

Phase 5

1658 context 507. Incomplete knife of blade back form D, missing its tip (overall L 64mm, W 10mm, tang L 18mm; Figure 15.1).

1695 context 315. Probable knife blade (L 35mm, W 25mm, Th 8mm) of unknown blade back form.

1825 context 397. Probable knife blade point (L 64mm, W 18mm) of unknown blade back form.

1922a context 547. Knife of blade back form B which has lost its tang (overall L 185mm, blade L 106mm, W 25mm). The blade at the tip is concave (as well as the back).

Phase 7

1552 context 205 (8.00E, 103.40N, 5.97OD). Small knife of blade back form C1 (overall L 58mm, blade L 38mm, W 13mm; Figure 15.1).

2341 context 205 (sample square 6684). Tiny knife of blade back form E (overall L 66mm, blade L 41mm, W 22mm) with the handle's wood grain visible.

15.3 Chisels and gouges

The assemblage includes three tanged chisels, a socketed chisel and a gouge. A complete tanged chisel (SF 2288) lay within house floor 701 in phase 3. Another (SF 1922b) lay in the construction fill of a house wall in phase 5. A third tanged chisel, with a broken tip (SF 2529), came from the windblown sand layer 376 in phase 6. A broken socketed chisel (SF 1565) came from fill layer 386 in phase 5. All the chisels are rectangular in section and have flat blades 8mm, 9mm and 11mm wide. The gouge (SF 1614) from phase 7's construction fill is complete and has a U-shaped blade and a circular cross-section.

Phase 3

2288 context 701 (sample square 7507). Tanged chisel (L 75mm, W 8mm, tang L 12mm) with a rectangular cross-section. Its tip is slightly curved.

Phase 5

1565 context 386. Small incomplete socketed gouge or chisel (L 25mm, W 12mm, Th 8mm) with the socket partially broken. Its flat blade is 11mm wide (Figure 15.1).

1922b context 547. Tanged chisel (overall L 78mm, tang L 30mm) whose blade is 6mm wide and slightly splayed.

Phase 6

2529 context 376 (6810). Tanged chisel (overall L 101mm, tang L 25mm) with a broken tip and rectangular in section (7mm × 8mm). Its blade was formerly 9mm wide (Figure 15.1).

Phase 7

1614 context 209. Gouge (L 153mm) with a circular cross-section (D 6mm), narrowing to a point at one end and a blade (W 10mm, Th 4mm) with a curved end at the other (Figure 15.1).

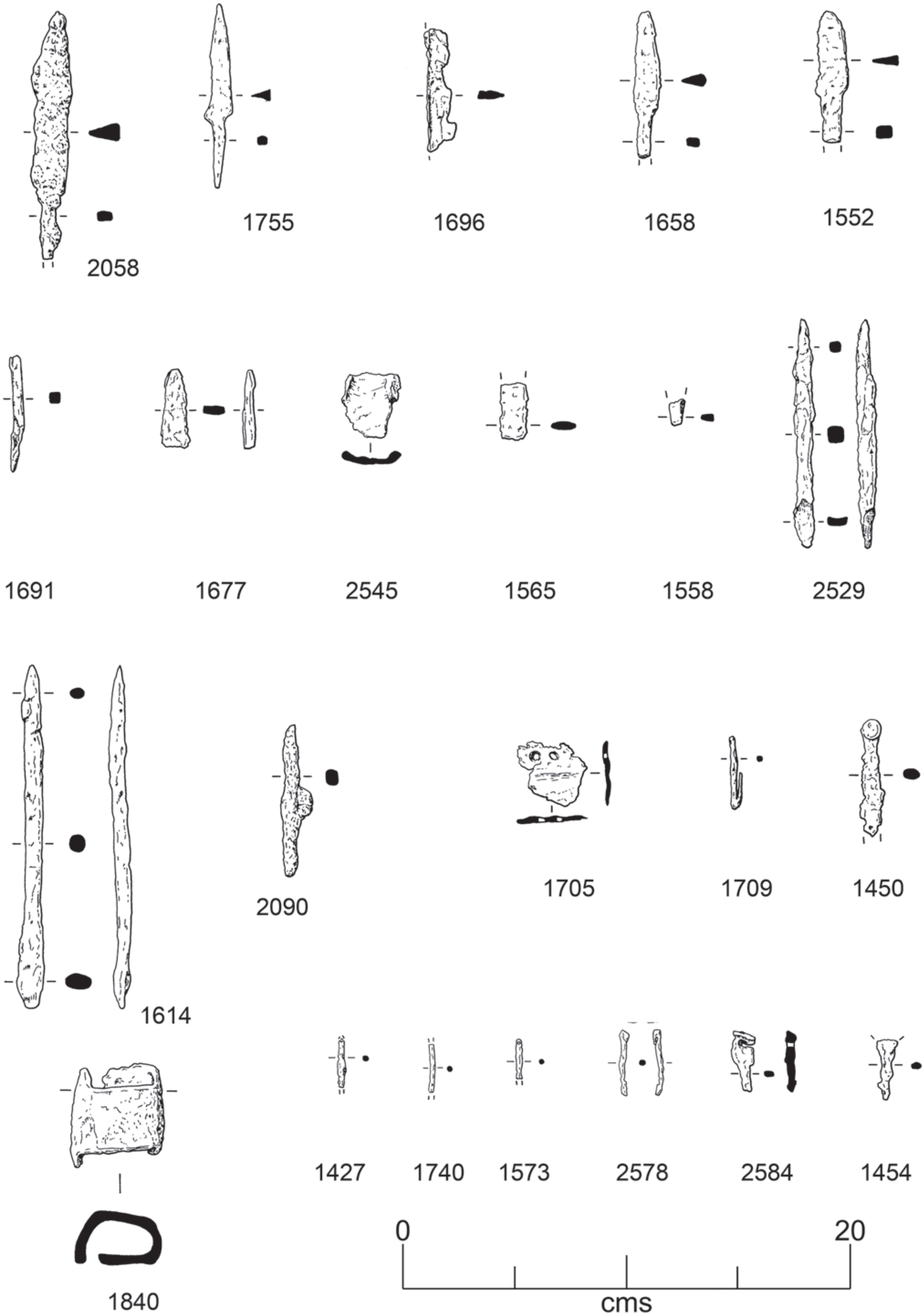

Figure 15.1. Iron tools including knives and needles

15.4 Wedges

There is a single wedge-shaped, broken blade (SF 2242) which comes from the floor (544) of House 500 Stage I in phase 4. It is the tip of a wedge since it is not sufficiently wide for an axe-blade.

Phase 4

2242 context 544 (7140). Wedge (or incomplete wedge-shaped blade) (L 58mm, W 29mm, Th 15mm at its broken end).

15.5 Textile- and leather-working tools

The manufacture of clothing and fabrics appears to have been a significant element of the farmstead's economy, not only from the evidence of the iron, bone and antler tools but also from the environmental evidence for flax processing. In the assemblage of textile- and leather-working tools, the most numerous artefacts are the teeth of heckles or combs.

Flax heckles and wool combs

These items and their fragments are often hard to identify with certainty. The teeth, especially when broken, have few diagnostic characteristics to set them apart from sections of spikes, rods, needles and pins, whilst what survives of the binding plate – into which the teeth would have been set – may be no more than a broken pierced plate. The teeth were set into the binding plate in a series of parallel but staggered rows.

Fifty heckles or combs have been recorded from Norway (Petersen 1951 cited in Ottaway 1992: 540) and other examples are noted by Ottaway from London and Harrold (Beds.), along with teeth from Jarlshof. Nearly complete iron heckles came from wealthy pagan female burials at Ardvonrig, Barra; Ballinaby, Islay and Westness (1963), Rousay (Graham-Campbell and Batey 1998: 82–3, 124, 136).

The fragment of iron binding plate (SF 1705), recovered from midden fill layer 313 in phase 5, is almost certainly diagnostic of a wool comb. The row of four holes and indentations for another parallel, staggered row of holes provide just enough evidence for this artefact's positive identification (Rogers in Ottaway and Rogers 2002: 2733). It is closely paralleled by the more complete item found at Coppergate, York (Ottaway 1992: 538–40). Despite the presence of other, flax-processing artefacts and of carbonized flax seeds, the Cille Pheadair binding plate therefore derives most probably from a wool comb.

There are 11 iron spikes/rods from Cille Pheadair that are probably heckle or wool comb teeth. It is often difficult to be certain whether such tools were flax heckles or wool combs (or used on both materials) but flax heckle spikes/teeth are generally shorter whilst wool comb teeth are often rounder (Rogers in Ottaway and Rogers 2002: 2733).

None of the Cille Pheadair iron teeth is complete and all but one are under 70mm long, with the longest (SF 1969) being 103mm. All are circular in cross-section (D 3mm–5mm) but one (SF 2612) has a square cross-section at its basal end. It is thus impossible to assign them definitively to the category of flax heckle spike (60mm–110mm) or wool comb tooth (90mm–186mm) though SF 1969 probably belongs to the latter. One came from a windblown sand layer (621) in phase 1 and one from the floor (205) of House 312 in phase 7; the remainder are from phases 3, 4 and 5. That from phase 3 came from the sandbank wall (528). All three of those in phase 4 came from the floor of House 500 Stage I. The six from phase 5 came from the northeastern midden layers 023 and 308, from construction layer 533 and from entrance passage fill 386, and windblown sand 313.

Phase 1

2090 context 621. Incomplete rod (L 68mm, D 4mm), probably the tooth of a wool comb or flax heckle (Figure 15.1).

Phase 3

1745 context 528. Incomplete rod (L 33mm, D 3.5mm), probably the tooth of a wool comb or flax heckle.

Phase 4

1969 context 548 (sample square 7103). Rod (L 103mm, D 5mm) bent back on itself with the appearance of a staple (50mm × 23mm). This is probably the tooth of a wool comb or flax heckle.

2105 context 565 (7475). Incomplete rod, circular in section (L 60mm, D 5mm), probably the tooth of a wool comb or flax heckle.

2514 context 504 (7199). Incomplete rod, circular in section (L 31mm, D 5mm), probably the tooth of a wool comb or flax heckle.

Phase 5

1557 context 386. Incomplete rod (L 41mm, D 4mm) with a tip. It is the tooth of a wool comb or flax heckle.

1705 context 313. Incomplete pierced plate (L 32mm, W 24mm, Th 1.5mm) with a line of four holes (D 3mm) with centres 8mm apart. The plate has broken across two of the holes. There are indentations which indicate the existence of an alternating second line of holes. This is part of the binding plate of a wool comb (Figure 15.1).

1932 context 533. Three lengths of rod (total L 150mm, D 5mm), corroded into a mass and bent. There is no evident tip or head but these are probably the teeth of a wool comb or flax heckle.

2445 context 308. Incomplete L-shaped rod with a circular cross-section (L 27mm x 8mm, D 3mm), possibly the base of a tooth from a wool comb or flax heckle.

2597 context 308. Incomplete rod (L 13mm, D 3mm), possibly the base of a tooth from a wool comb or flax heckle.

2612 context 023. Incomplete rod, square in cross-section at one end (5mm x 5mm) and circular at the other (D 3mm), probably the tooth of a wool comb or flax heckle.

Phase 7

1450 context 205 (6684). Incomplete circular-sectioned shank (L 54mm, D 4mm), probably the tooth of a wool comb or flax heckle. Its head appears to be rounded (D 9mm) and flattened (Figure 15.1).

Needles

There are six incomplete iron needles and eight probable needle fragments (see Chapter 14 for the bone needles). None are made of copper alloy. Of the four with complete eyes, three are lentoid (SF 1814 from phase 1, SF 2578 and SF 2454 from phase 7) whilst another (SF 1573 from phase 7) is punched and circular. A poorly preserved example (SF 2296 in phase 2) also appears to have a lentoid eye.

The appearance of a circular eye towards the end of the sequence corresponds with the rise in punched round eyes noted in the Anglo-Scandinavian period in York (Rogers in Ottaway and Rogers 2002: 2739). Two of the needles (SF 1427 and SF 1928, phase 5) have broken across the eye and another (SF 2584, phase 8) has what appears to be a broken circular eye.

All are circular in cross-section apart from SF 1092 and SF 2353 which are square (1.5mm × 1.5mm) and rectangular (3mm × 2.5mm) respectively. The circular diameters are between 1.5mm and 2mm except for SF 2296 which is 3mm in diameter.

Iron needles are present in every phase except phases 3, 6 and 9 (note that in phases 6 and 9 it appears that no substantial dwellings were inhabited at the site). The broken needle shafts can be distinguished from those of pins on the basis of their smaller diameters but some pins can be as thin as 3mm in diameter. Surprisingly, three needles come from construction fills (SFs 1814, 1928 and 1932). Four are from floor layers (SF 2353 from 548 in phase 4, SF 2578 from 060 in phase 7, SF 1573 from 205 in phase 7, and SF 1798 from 108 in phase 8) and the remainder are mostly from midden deposits.

Phase 1

1814 context 321. Incomplete needle and eye (L 16mm, D 1.5mm, with the eye 0.5mm × 1.5mm).

Phase 2

2296 context 582. Incomplete circular-sectioned rod (L 56mm, D 3mm) which is probably a needle. A possible eye (L 5mm) is visible 13mm from its complete end.

Phase 4

1740 context 430. Incomplete needle or pin (L 20mm, D 2mm; Figure 15.1).

2353 context 548 (sample square 7103). Incomplete needle or pin shank (L 16mm) with a rectangular cross-section (3mm × 2.5mm).

Phase 5

1092 context 308 (13.65E, 114.70N, 6.17OD). Incomplete needle or thin pin (L 47mm) with a square cross-section (1.5mm × 1.5mm).

1427 context 351. Incomplete needle (L 21mm, D 2mm), broken across the eye (D 1mm) and on the shaft (Figure 15.1).

1709 context 313. Incomplete rod (L 31mm, D 1.5mm), folded back on itself (by 14mm). It is possibly a crude or unfinished needle (Figure 15.1).

1928 context 533. Incomplete needle (L 48mm), bent in four places to give it a zig-zag shape. Its broken eye is visible at one end and the point has broken off the other end.

2471 context 313. Incomplete rod (L 19mm, D 2mm), probably a needle shaft.

Phase 7

1573 context 205. Incomplete needle (L 18mm, D 2mm) with an eye 1mm dia. (Figure 15.1).

2454 context 116. Incomplete needle (L 24mm, D 2mm) with an eye 1mm × 1.5mm.

2578 context 060 (6095). Incomplete needle (L 29mm, D 1.5mm) with an eye 2mm × 0.5mm (Figure 15.1).

Phase 8

1796 context 108 (6756). Incomplete needle shaft and point (L 21mm, D 1.5mm).

2584 context 054. Incomplete rod (L 27mm, D 2mm widening to 12mm at its end) which may be a broken-off pin-head or a large needle. It has a crotchet-shaped indentation at its head which has probably been formed from a former eye (D 2mm) broken by a heavy blow to the top of the head (Figure 15.1).

Awls

There are no certainly identified awls from Cille Pheadair but two items should be mentioned (for possible bone awls, see Chapter 14). One is a broken conical artefact with a sharp point (SF 1454, from the floor layer 214 of House 312 in phase 7). The other is a broken iron strip, tapered at both ends (SF 1252, from abandonment layer 203 in phase 7).

Phase 7

1252 context 203. Small strip (L 36mm, W 3mm–9mm, Th 2mm) curved along one side and tapering at both ends.

1454 context 214. Small conical and sharply pointed object (L 29mm, D 10mm at its base), possibly a socketed awl (Figure 15.1).

15.6 Agricultural tools

A few large broken pieces may derive from iron tools. SF 1225 is the broken blade of a billhook (from midden layer 311 in phase 7). The other four items are not identifiable with any certainty. There is a broken iron sleeve or socket (SF 1840, from pit fill 607 in phase 1) which might have been the haft of a large tool. A rectangular-sectioned bar (SF 2166, also from a pit fill [717] in phase 1) could also be the broken blade of a large tool. From 622 in phase 2, a bent strip (SF 2119) with an oval cross-section could be part of a socket. A flattened U-shaped plate fragment (SF 2545, from 219 in phase 5) might also be a broken socket or sleeve.

Phase 1

1840 context 608. Broken sleeve or socket (L 45mm, W 41mm) with a rectangular section (internally 28mm × 15mm) from the haft of a large tool or agricultural implement (Figure 15.1).

2166 context 717. Incomplete rectangular-sectioned bar (L 60mm, W 6mm, Th 4mm) whose central section (L 40mm) is indented by 2mm along one side. It may possibly be a broken tool blade.

Phase 2

2119 context 622. Incomplete bent strip (L 40mm) with an oval cross-section (3mm × 4mm). One end is splayed (6mm across) and it may be a small tool.

Phase 5

2545 context 219. Plate fragment bent into a flattened U-shape (L 28mm, W 24mm, internally W 18mm, Th 2mm), possibly an incomplete rectangular-sectioned sleeve or socket for a tool (Figure 15.1).

Phase 7

1225 context 311. Incomplete blade of a billhook (overall L 92mm, W 20mm–31mm). The squared-off tip is 20mm wide for its last 45mm and, below this, the blade widens to 31mm (Figure 15.2).

15.7 Other possible tools

Phase 3

1750 context 528. Probable tang (L 52mm, W 5mm, Th 5mm) terminating in a point and slightly curved. If not a tool, it is possibly a broken nail shank.

Phase 5

1677 context 308. Incomplete tapered and slightly curved bar (L 34mm), probably the tang of a knife or other tool (Figure 15.1).

1691 context 315. Incomplete bar or tang (L 51mm, W 4mm, Th 4mm), slightly curved with a square cross-section and a wedge-ended tip (Figure 15.1).

1423 context 351. Incomplete pointed and tapered tang (L 37mm, W 9mm, Th 6mm).

1404 context 351. Incomplete tapered strip (L 35mm, W 4mm–8mm, Th 5mm) which is possibly a tang.

1558 context 386. Tiny incomplete socket (L 11mm, D 7mm) to hold a wooden shaft 5mm wide (Figure 15.1).

15.8 Arrowheads

There are three arrowheads and one other item which is either an arrowhead or a knife tang. Two of the three definite arrowheads come from phase 6, a period when iron artefacts are almost absent from the site. One is a tanged arrowhead with a triangular blade (SF 1655 from 398). The other is a large socketed arrowhead with a triangular blade with sloping shoulders (SF 1613 from 404). Its socket would have been attached to the 11mm-diameter arrowshaft by a rivet. The third arrowhead comes from a phase 7 construction layer (359). It is a tanged example with a lozenge-shaped blade (SF 1457).

The fourth object SF 1588 (from 386) is a tapered strip with one side curved and the other straight. It may be the tang of a knife, but is possibly a broken arrowhead.

The association of arrowheads with phase 6 and the beginning of phase 7 (and perhaps also with the end of phase 5) is very interesting since this is such a brief period of the site's use and also a time when no-one was actually living there. The appearance of two arrowheads within construction deposits is also of interest since they may have been placed there deliberately.

Phase 5

1588 context 386. Small possible tanged arrowhead or the broken tang of a knife (L 48mm, W 7mm, Th 4mm) with one side straight (perhaps broken off down the centre) and the other curved outwards near the point and again at the base. If it is a split arrowhead, which seems unlikely, then its original dimensions would have been *c*. 14mm wide with a tip 21mm long (Figure 15.2).

Phase 6

1613 context 404 (9.45E, 108.70N, 6.22OD). Socketed arrowhead (L 90mm, originally W 25mm) which was formerly riveted to an arrowshaft 11mm in diameter (the rivet is D 9mm; Figure 15.2). It is of Jessop's type MP3, dating elsewhere to the tenth–sixteenth centuries (Jessop 1997: 196).

1655 context 398. Tanged arrowhead (L 61mm, tang L 30mm, W 18mm, Th 5mm; Figure 15.2). It is of Jessop's

type T2, dating elsewhere to the eleventh–twelfth centuries (Jessop 1997: 195).

Phase 7

1457 context 359 (10.00E, 107.30N, 6.36OD). Lozenge-shaped arrowhead (L 72mm, W 15mm, Th 3mm) whose tip is 20mm long (Figure 15.2). It is a long, thin variant of Jessop's type T2, dating elsewhere to the eleventh–twelfth centuries (Jessop 1997: 195).

15.9 Cauldrons, suspension hooks and containers

There are seven iron items which may be pieces of broken cauldrons and associated suspension gear.

The remains of cauldrons or iron buckets are a raised lug (SF 2325 from 596 in phase 1) and an eyed lug (SF 1700 from 320 in phase 3). Riveted curved plates (SF 2306 from 582 in phase 2 and SF 1693 from 315 in phase 5) may also be sections of broken-up cauldron. A chain link (SF 2371 from 607 in phase 1) and two suspension hooks (SF 1063 and 1087 both from 308 in phase 5) are almost certainly suspension gear by which cauldrons were held over the fire.

Phase 1

2325 context 596. Incomplete round-ended plate (L 34mm, W 28mm, Th 1.5mm) pierced by a hole which contains a broken-off nail or rivet. This is probably a raised lug for suspending the handle of a bucket or cauldron (Figure 15.2).

2371 context 607. Incomplete ring-headed rod (L 83mm, D 9mm) with the rod looped round at the end to form a hole (D 8mm). The other end was similar (C-shaped and not S-shaped) but has broken off. This is probably a chain link for suspension of a bucket or cauldron.

Phase 2

2306 context 582. Incomplete curved plate (L 40mm, W 31mm, Th 3mm) with a rivet (D 7mm) through it. The circular rivet head is 21mm dia. The distance from the rivet to the sheet is 3mm, probably the thickness of a torn-off overlapping plate. This is possibly a cauldron fragment.

Phase 3

1700 context 320. Eyed lug (suspension fitting) of a cauldron or bucket. The lug (H 34mm, W 40mm) stands proud of the iron rim and the diameter of the eye is 11mm. The cauldron/bucket is 1mm–2mm thick and there are two iron strips protruding on the inside of the vessel below the lug. Surface coating was noted during air abrasion and was identified by electron microscopy as copper with traces of zinc and tin (Figure 15.2).

Phase 5

1063 context 308 (14.69E, 113.53N, 5.87OD). Suspension hook (L 53mm) with an L-shaped top at 90° to the hook at the base. The hook is 15mm wide and might have carried a handle 5mm wide. This is a suspension hook, probably for a small cauldron or pot (Figure 15.2).

1087 context 308 (13.90E, 112.95N, 6.33OD). Suspension hook (L 61mm) with an L-shaped head and a hook (W 26mm) capable of holding a handle 18mm wide. It is probably part of the suspension equipment of a cauldron (Figure 15.2).

1693 context 315. Two riveted plates (L 54mm, W 39mm, Th 4mm and 2mm) held together by two rivets (D 16mm and 18mm). The plates are slightly curved and may have come from a cauldron or other container (Figure 15.2).

Small containers or tubes

Four items are broken sections of curved plate or strip and may derive from iron objects larger than ferrules and tubes but smaller than vessels.

These curved plate fragments are not precisely identifiable but may come from concave and cylindrical iron forms. One curved strip might have once been part of a flat-rimmed iron bowl 110mm in diameter (SF 1608 from 384 in phase 4).

The other fragments are from cup-sized or smaller containers. A piece of curved plate (SF 2280 from 569 in phase 4) was probably part of a cylinder 25mm–30mm across. Two curved plate fragments (SF 2342 from 126 in phase 4) might have been part of a small conical container about 35mm–40mm in diameter. Finally, there is a small conical fragment (SF 1802) from 600 in phase 2.

Phase 2

1802 context 600. Incomplete conical fragment (H 0.9mm, D originally 1.5mm at its base and 0.8mm at its top) with a concave surface (Figure 15.2).

Phase 4

1608 context 384. Curved strip (L 48mm, W 13mm, Th 3mm) which appears to have a flat rim and has possibly been clipped. It may possibly have been part of a shallow iron bowl 110mm in diameter (Figure 15.2).

2280 context 569. Incomplete curved plate (L 33mm, W 24mm, Th 4mm) which was probably originally part of a cylinder 25mm–30mm in diameter.

2342 context 126. Two fragments of an incomplete curved and tapered plate (L 53mm, W 19mm–5mm, Th 3mm), possibly originally part of a conical or cylindrical object *c*. 35mm–40mm in diameter.

15.10 Boat fittings: clench nails and roves

Clinker-built boats are constructed with clench nails, variously described as clench bolts, boat nails or ship

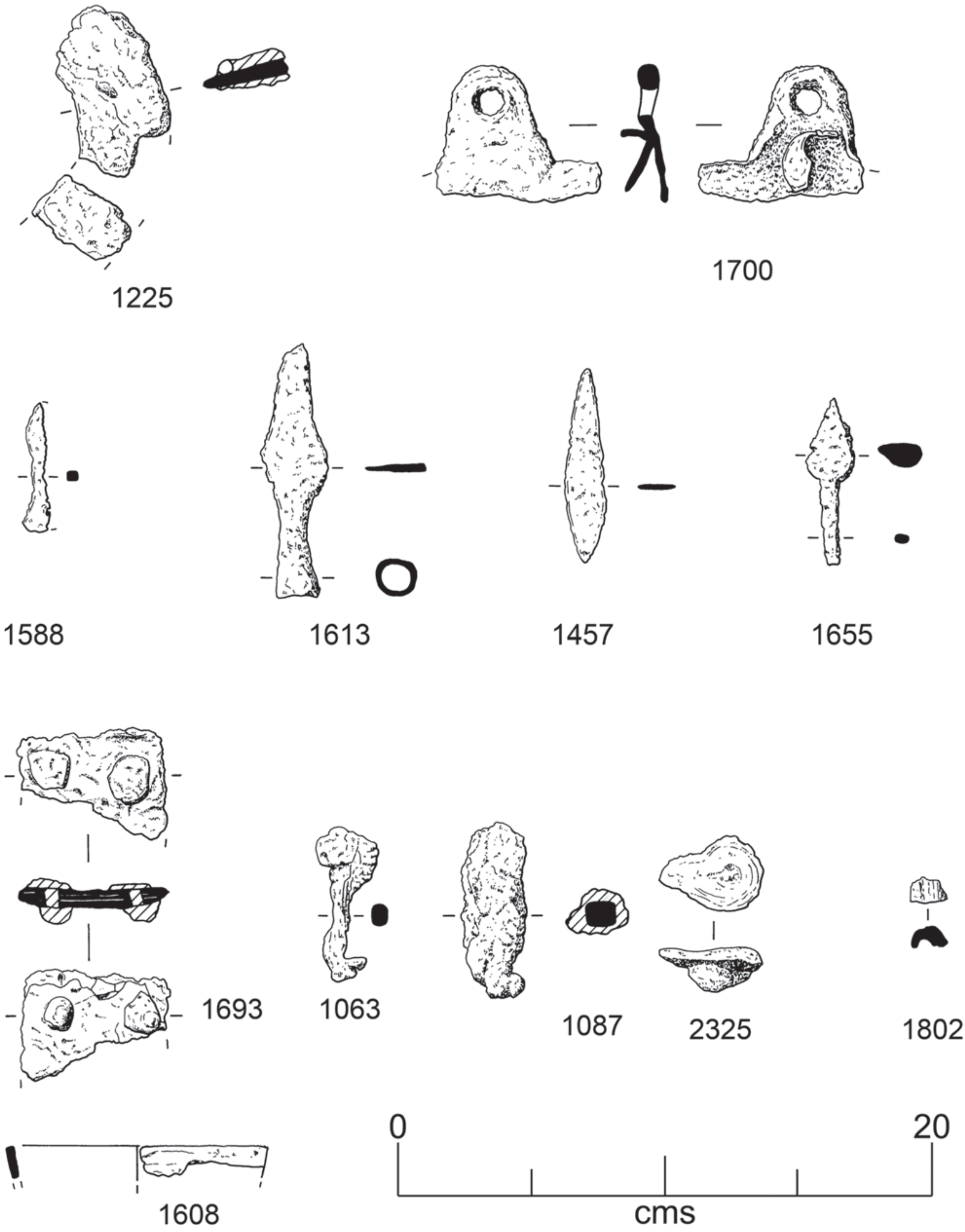

Figure 15.2. Iron items including arrowheads and a cauldron lug

rivets (Ottaway 1992: 615–18; Bill 1994). These secure the boat's planks together by having a rove – a pierced iron plate – fitted like a washer or nut on the tip of the clench nail. The clench nail is then secured in place by hammering to flatten the end of the nail and prevent the rove from coming off.

There are 147 clench nails and 171 roves from Cille Pheadair. Many of the clench nails were found with roves

still attached to them (see catalogue below). The total of 171 roves counts only those roves found detached from nails; in some cases items counted as roves have very small fragments of nail still present in the central hole; all are described in the catalogue below. Also not included in these totals are the three clench nails probably used for furniture or wooden containers (see ‘Clench fasteners’, below) and the lead clench nail (SF 2270 in 554; see Chapter 13.15).

This is a large assemblage for any settlement and is greater than the numbers from Anglo-Scandinavian or medieval York (Ottaway 1992: 615; Ottaway and Rogers 2002: 2830).

The clench nails and roves occur in all phases except phase 9:

- five clench nails and 18 roves in phase 1,
- 14 clench nails and 17 roves in phase 2,
- 13 clench nails and 24 roves in phase 3,
- 23 clench nails and 35 roves in phase 4,
- 44 clench nails and 35 roves in phase 5,
- nine clench nails and five roves in phase 6,
- 28 clench nails and 28 roves in phase 7,
- nine clench nails and nine roves in phase 8,
- one clench nail and one rove in 001 (unstratified).

Table 15.5 shows the quantities of the various types of clench nail and rove present in each phase. Clench nail-stems and rove holes from Cille Pheadair are mostly circular, with only a small proportion square. The latter are present throughout the Cille Pheadair sequence (phase 1 to phase 7) but are only proportionally numerous in phase 1. Square-shanked clench nails are thought to be characteristic of a Baltic tradition of clinker-building prior to AD 1100 but after that, square-sectioned clench nails come to dominate throughout the Baltic and North Sea except for Denmark and Dublin (Bill 1994: 60). The presence of mostly round-sectioned clench nails at Cille Pheadair indicates that the Western Isles can be added to these exceptions.

Clench nail-heads from Cille Pheadair are mostly round, with a smaller number of irregular (generally oval) heads occurring throughout phases 2 to 8. Square heads are present as single examples only in phase 1 and possibly in phase 5.

Rove shapes are mostly rectangular, with a much smaller number of rhomboid shapes. The rhomboid roves become more common towards the end of the sequence, particularly in phase 7. There is one round rove and two triangular ones but no curved examples. Two interesting finds, from phases 7 and 8 respectively, are strips of prepared but unused roves (SF 1482 in 209 and SF 1079 in 054), ready to be detached and fitted onto clench nails. Their presence indicates that boat-building, or at least boat repair, was an activity carried out at Cille Pheadair.

Wood grain is visible on six clench nail-stems:

- phase 1 (SF 2323 in 596; grain at 90° in two directions),
- phase 4 (SF 1794 in 370; SF 2561 in 504 and SF 2244 in 544),
- phase 5 (SF 2472 in 313 and SF 2257 in 534).

In examples where the rove was retrieved still attached to its clench nail, the distance between rove and nail-head (and thereby the thickness of the wood which they once fastened) varies from 4mm to 41mm in 53 measurable examples (Table 15.6). The 14 cases where the distance between rove and nail-head is less than 10mm perhaps indicate roves used for making furniture or other domestic items, although the roves might have shifted position on their nails after discard. Most rove:nail-head distances indicate a thickness of wood between 12mm and 41mm.

Jan Bill’s analysis of nail size has demonstrated a relationship between the size of the vessel and the average area of the clench nail shank’s cross-section (Bill 1994: 60). As he points out, thickness of the wood is not a good indicator of ship size since this varies within any vessel. The Cille Pheadair clench nails group into two main sizes, 7 sq mm–28 sq mm and 36 sq mm–64 sq mm (Table 15.7).

Bill demonstrates that those clench nail shanks generally under 40 sq mm are restricted to boats less than 14m long whereas those over 40 sq mm – of which there are 14 at Cille Pheadair – might be found on larger vessels between 14m and 18m long (Bill 1994: fig. 6). Since the latter are a small proportion of the total found at Cille Pheadair, it would seem that the boats of Cille Pheadair’s inhabitants were mostly small, in the region of 6m to 14m long.

Clench nails

Phase 1

1819 context 323. Clench nail (L 30mm) with a rectangular head 21mm x 18mm and a rove 20mm × 18mm. A triangular plate (L 36mm, W 35mm) is riveted between the rove and the base of the nail. Shank has a circular cross-section (D 4mm). The distance between nail-head and rove was originally 4mm (Figure 15.4).

2323 context 596. Incomplete clench nail (L 14mm) with a circular head D 21mm. Shank has a circular cross-section (D 6mm). The head’s underside has wood grain in two directions at 90°.

2360 context 607. Incomplete clench nail (L 41mm), with an incomplete rove. Shank has a square cross-section (5mm × 5mm).

2361 context 770. Incomplete clench nail (L 24mm) with a circular head D 18mm. Shank has a circular cross-section (D 6mm). The distance from nail-head to bend is 5mm.

2373 context 607. Incomplete clench nail (L 33mm) with an incomplete rove.

Phase 2

1210 context 332 (11.90E, 115.00N, 5.96OD). Incomplete nail (L 36mm), probably a clench nail. Shank has a circular cross-section (D 6mm).

1218 context 332. Small incomplete clench nail (L 22mm). Shank has a circular cross-section (D 4mm). The distance from nail-head to rove is 10mm.

1806 context 600. Incomplete clench nail (L 28mm) with a square rove 20mm x 20mm. Shank has a circular cross-section (D 3mm). The distance from nail-head to rove is 13mm.

1966 context 457 (12.84E, 107.60N, 5.87OD). Incomplete clench nail (L 15mm) with a circular head D 18mm. Shank has a circular cross-section.

Table 15.5. Types of rove and clench nail by phase

Phase	Square rove hole	Circular rove hole	Square nail section	Circular nail section	Rectangular rove	Rhomboid rove	Curved rove	Round rove	Triangular rove	Round nail-head	Irreg. nail-head	Square nail-head
1	8	6	1	3	18	1	0	0	0	2	0	1
2	2	14	0	9	21	1	0	0	1	1	2	0
3	5	12	0	2	26	1	0	0	0	2	2	0
4	2	24	3	16	36	4	0	0	0	4	3	0
5	5	18	7	25	48	4	0	0	0	16	2	1?
6	2	3	0	7	11	2	0	0	0	0	2	0
7	5	21	0	19	34	9	0	1	1	6	2	0
8	0	9	2	4	14	3	0	0	0	0	1	0
9	0	0	0	0	0	0	0	0	0	0	0	0
Total	**29**	**107**	**13**	**85**	**208**	**25**	**0**	**1**	**2**	**31**	**14**	**2?**

Note that the total number of roves includes both roves found attached to nails (listed in the catalogue as 'Clench nails') and the roves found detached (listed in the catalogue as 'Roves')

Table 15.6. Measurable distances (mm) between nail-head and rove, by phase

Phase	Distance between nail-head and rove (mm) = wood thickness (mm)																
1	4	6															
2	12	13	10	23	25	40											
3	2	8	10	14	20												
4	8	9	15	16	17	21	23										
5	6	6	7	7	8	8	10	12	13	14	14	14	15	19	23	25	30
6	16	16															
7	5	8	12	15	20	20	21	24	25	27	30						
8	11	20	41														
9	None																

Table 15.7. Clench nail cross-section sizes by phase

Phase	*2mm dia*	*3mm dia*	*4mm dia*	*4×4mm*	*5mm dia*	*5×5mm*	*6mm dia*	*5×6mm*	*6×6mm*	*7mm dia*	*7×7mm*	*8x8mm*
	3mm²	*7mm²*	*12mm²*	*16mm²*	*20mm²*	*25mm²*	*28mm²*	*30mm²*	*36mm²*	*38mm²*	*49mm²*	*64mm²*
1	0	0	1	1	2	5	4	2	2	0	0	0
2	0	1	5	0	7	0	7	0	0	4	0	0
3	0	1	4	2	3	3	2	0	0	0	0	2
4	0	4	11	0	10	2	4	0	3	4	0	2
5	1	7	12	5	12	2	8	0	0	0	2	1
6	0	2	0	1	2	0	1	0	0	1	1	1
7	1	4	14	0	19	2	1	0	0	0	4	0
8	0	2	2	2	5	1	1	0	0	1	1	0
9	0	0	0	0	0	0	0	0	0	0	0	0

2091 context 618. Clench nail (L 24mm) with a circular head D 20mm and a rectangular rove 25mm × 21mm. Shank has a circular cross-section (D 7mm). The distance from nail-head to rove is 23mm.

2108 context 573. Incomplete clench nail (L 31mm).

2118 context 620. Incomplete clench nail (L 25mm). Shank has a circular cross-section (D 5mm).

2123 context 618. Incomplete clench nail (L 13mm) with a triangular-shaped rove 30mm × 22mm.

2281a context 354. Incomplete clench nail (L 31mm) with a rove 20mm × 18mm. Shank has a circular cross-section (D 5mm). The distance from the missing nail-head to the rove is 25mm.

2285 context 600. Incomplete clench nail shank (L 13mm) with an incomplete rove.

2295 context 582. Incomplete clench nail (L 28mm) with an incomplete rove.

2303 context 582. Clench nail (L 25mm) with a head made of a strip of two conjoined roves 34mm × 22mm, and a rove 18mm × 17mm. Shank has a circular cross-section (D 7mm). The distance from nail-head to rove is 12mm.

2317 context 618. Incomplete clench nail shank (L 50mm) with an incomplete diamond-shaped rove 32mm × 25mm. Shank has a circular cross-section (D 7mm). The distance from the missing nail-head to the rove is 40mm.

2318 context 618. Incomplete clench nail (L 21mm) with a rove 22mm × 22mm.

Phase 3

1157 context 324. Incomplete nail shank (L 19mm), probably of a clench nail.

1158 context 324. Incomplete nail shank bent over (L 15mm), probably a clench nail.

1748 context 528. Incomplete bent clench nail (L 14mm) with a slightly domed circular head D 18mm. Shank has a circular cross-section.

1773 context 432. Incomplete and bent clench nail (L 14mm) with a damaged rove 18mm x 15mm.

1831 context 319. Incomplete clench nail (L 14mm) with a circular head D 20mm. The broken shank has a circular cross-section.

1983 context 459. Incomplete clench nail (L 35mm). The distance between the missing nail-head and an incomplete rove is 20mm.

1987 context 459. Incomplete clench nail (L 24mm).

2023 context 462. Clench nail (L 20mm) with a rove 18mm x 17mm and an oval head 20mm × 17mm. The distance between nail-head and rove is 2mm.

2232b context 454. Incomplete clench nail shank (L 20mm). The distance between missing nail-head and missing rove is 10mm.

2269 context 701 (7526). Incomplete clench nail (L 28mm) with a rove 22mm × 21mm. The distance between the missing nail-head and rove is 14mm.

2364 context 701 (7563). Large clench nail (L 22mm) with a domed diamond-shaped head 38mm x 18mm. The distance from nail-head to bend is 8mm and is filled with the remains of fragments of plate.

2641 context 701 (7599). Incomplete clench nail (L 26mm) with an incomplete rove.

2795 context 324. Broken clench nail (L 44mm) with an oval head 32mm × 27mm and an incomplete rove 25mm x 21mm. The distance from nail-head to rove is 25mm.

Phase 4

1435 context 356. Incomplete nail (L 16mm), probably an incomplete clench nail.

1694 context 422. Incomplete clench nail (L 8mm) with an oval head 20mm × 16mm. The bent shank has a circular cross-section.

1709 context 429. Clench nail (L 12mm) with a circular head D 25mm and a diamond-shaped rove originally 40mm × 29mm. Shank has a circular cross-section. There is no apparent gap between nail-head and rove.

1794 context 370 (6745). Clench nail (L 13mm) with a circular head (D 12mm) through an incomplete strip or plate (L 22mm, W 13mm) with wood grain imprints on its underside. Shank has a circular cross-section (D 3mm).

1812 context 440. Broken-off circular-sectioned nail shank (L 20mm, D 4mm), probably a clench nail.

1957 context 133. Incomplete clench nail (L 20mm). Shank has a circular cross-section (D 7mm).

1972 context 440. Incomplete clench nail (L 33mm). Shank has a circular cross-section (D 4mm).

2001 context 544 (7113). Incomplete clench nail (L 27mm) with an incomplete rove 22mm × 15mm with a circular hole (D 5mm).

2027 context 555 (7372). Clench nail (L 43mm) missing its rove. The distance between nail-head and missing rove is 23mm.

2066 context 553. Incomplete clench nail (L 25mm).

2086 context 569. Incomplete clench nail (L 18mm). Shank has a circular cross-sectioned shank (D 3mm). The distance from nail-head to rove is 9mm.

2129 context 562. Incomplete clench nail (L 37mm) with a circular head D 22mm with a square cross-section (6mm × 6mm).

2244 context 544 (7113). Incomplete clench nail shank (L 23mm) with an oval head 11mm × 9mm. Shank has a circular cross-section (D 6mm) and wood grain on one side. The distance from nail-head to missing rove is 17mm.

2259 context 548 (7091). Incomplete clench nail (L 28mm) with a rove 30mm × 22mm. The circular-sectioned shank (D 8mm) has lost its head.

2260 context 548 (7091). Incomplete clench nail (L 44mm) with an oval head 23mm × 18mm. The distance from nail-head to missing rove is 21mm.

2283 and 2142 context 569. Incomplete clench nail shank (L 26mm) with a rove 20mm × 20mm.

2286 context 553. Incomplete clench nail shank (L 34mm) with an incomplete rove.

2290 context 569. Clench nail (L 22mm). Shank has a circular cross-section (D 5mm) lying on top of a rove 18mm x 18mm.

2335 context 544 (7126). Incomplete clench nail (L 24mm) with a square cross-section (5mm × 5mm).

2358 context 565. Clench nail (L 35mm) with a circular head D 21mm and a rectangular rove 29mm x 26mm. Shank has a circular cross-section (D 9mm). The distance from nail-head to rove is 16mm.

2428 context 430. Incomplete clench nail with a rove 20mm × 20mm with a circular hole (D 6mm).

2561 context 504 (6980). Clench nail (L 24mm) with wood grain on the rove. Circular, domed head D 20mm and the rove is 20mm x 20mm. Shank has a circular cross-section (D 6mm). The distance from nail-head to rove is 15mm.

2659 context 565 (7542). Incomplete clench nail (L 9mm). Shank has a circular cross-section (D 7mm).

Phase 5

1011 context 010 (14.10E, 114.00N). Incomplete clench nail (L 30mm, D 3mm). The distance from nail-head to rove is 19mm.

1048 context 010. Incomplete clench nail (L 18mm) with an incomplete rove 32mm × 22mm.

1067 context 308. Incomplete clench nail (L 21mm) and diamond-shaped rove (originally 30mm × 26mm). Shank has a circular cross-section (D 6mm).

1073 context 308 (14.73E, 112.38N, 6.41OD). Large clench nail (L 45mm) with a square/round head (22mm across) with a large diamond-shaped rove 52mm × 36mm. The distance from nail-head to rove is 30mm (Figure 15.4).

1081 context 308 (13.30E, 112.30N). Incomplete clench nail (L 23mm). The distance from nail-head to rove is 11mm.

1095 context 308 (15.30E, 112.15N, 6.38OD). Incomplete clench nail shank (L 18mm) and rove 26mm × 20mm.

1109 context 313 (10.90E, 116.90N, 6.39OD). Incomplete clench nail (L 18mm). Shank has a circular cross-section (D 5mm).

1405 context 351. Incomplete clench nail (L 14mm) with a square rove 18mm × 18mm. Shank has a circular cross-section (D 4mm).

1409 context 351. Incomplete clench nail (L 17mm) with a rove 20mm × 18mm. Shank has a circular cross-section (D 5mm).

1413 context 351. Incomplete clench nail (L 19mm) with a broken rectangular rove originally 24mm × 17mm. Shank has a circular cross-section (D 5mm).

1422 context 351. Incomplete nail (L 30mm) with an oval head 24mm × 20mm. Shank has a circular cross-section (D 4mm). Probably a clench nail.

1426 context 351. Incomplete nail (L 18mm). Shank has a circular cross-section (D 6mm). Probably part of a clench nail.

1539 context 219 (7.21E, 102.67N, 6.44OD). Clench nail (L 23mm) with a damaged head and rove. Shank has a rectangular cross-section (4mm × 4mm). The distance from nail-head to rove is 14mm (Figure 15.4).

1546b context 114. Incomplete clench nail (L 23mm) with a rectangular rove 18mm × 17mm. Shank has a circular cross-section. The shank probably conjoins with nail-head SF 1546a, to give a distance of 14mm between nail-head and rove (Figure 15.4).

1549 context 386. Clench nail (L 28mm) with a formerly circular head D 20mm and a formerly rectangular rove 20mm × 18mm. Shank has a circular cross section (D 3mm). The distance between nail-head and rove is 14mm (Figure 15.4).

1559 context 386. Incomplete shank (L 18mm), probably from a clench nail.

1590 context 386. Incomplete clench nail (L 18mm) with a damaged rove 21mm × 18mm. Shank has a circular cross-section (D 5mm). The distance from the missing nail-head to the rove was originally 13mm.

1618 context 010. Clench nail (L 32mm) with a circular head D 15mm and a rectangular rove 15mm × 14mm. Shank has a circular cross-section (D 4mm). The rove has slipped but the original distance from nail-head to rove was 23mm (Figure 15.4).

1625 context 010. Incomplete clench nail (L 14mm) with a round head D 17m). Shank has a circular cross-section.

1627 context 506 (8.40E, 3.30N, 1.98OD). Clench nail (L 16mm) with a circular head D 13mm and a rectangular rove 18mm × 16mm. Shank has a circular cross-section (D 6mm), with a distance of 7mm between nail-head and rove (Figure 15.4).

1644 context 308. Incomplete nail (L 27mm). Shank has a square cross-section (5mm × 5mm). Probably a clench nail.

1657b context 313. Incomplete nail (L 26mm) with a circular head D 16mm. Shank has a square cross-section. Probably a clench nail (Figure 15.4).

1657c context 313. Incomplete nail (L 31mm) with a circular head D 13mm. Shank has a square cross-section. Probably a clench nail (Figure 15.4).

1663 context 313. Incomplete clench nail (L 25mm). Shank has a circular cross-section (D 3mm). The distance from nail-head to rove is 10mm.

1668 context 416. Clench nail (L 23mm) with a circular head D 14mm and a square rove 20mm × 21mm. Shank has a circular cross-section (D 3mm). The distance from nail-head to rove is 12mm (Figure 15.4).

1684b context 308. Broken clench nail (L 25mm) with a damaged rove and no head. Shank has a square cross-section (5mm × 5mm).

1710 context 313. Incomplete and bent nail (L 31mm) with a circular head D 11mm. Shank has a square cross-section (2mm × 2mm). Probably a clench nail.

1900 context 010. Incomplete nail (L 35mm), probably a clench nail.

1918 context 534. Incomplete clench nail (L 22mm).

1950 context 308. Clench nail (L 37mm) with a circular head D 15mm. Shank has a circular cross-section (D 5mm).

2236 context 534. Incomplete clench nail (L 14mm) with an oval head 20mm × 17mm. Shank has a circular cross-section (D 8mm).

2237 context 534. Clench nail (L 22mm) with a circular head D 22mm and a rectangular rove 20mm x 18mm and a small plate (22mm × 20mm) – possibly another rove – adhering to the rove. Shank has a circular cross-section (D 4mm). The distance from nail-head to rove is 6mm.

2257 context 534. Incomplete clench nail shank (L 28mm). Shank has a circular cross-section (D 6mm). The distance from nail-head to missing rove is 15mm. The clench nail is surrounded by wood grain imprints.

2350 context 503 (7282). Clench nail (L 30mm) with an oval head 24mm × 18mm. Shank has a rectangular cross-section. The distance from nail-head to missing rove is 8mm.

2406 context 315. Clench nail (L 23mm) with a circular head D 17mm and a rectangular rove 20mm × 18mm. Shank has a circular cross-section (D 9mm). The distance from nail-head to rove is 6mm.

2465 context 308. Incomplete clench nail (L 20mm) with a broken rove originally 18mm × 18mm.

2472 context 313. Incomplete clench nail (L 11mm) with a rove 16mm × 16mm. Shank has a circular cross-section. There is wood grain on the underside of the rove.

2562 context 308. Incomplete clench nail (L 18mm) with a circular head D 18mm. The distance from nail-head to rove is 8mm.

2567 context 351. Incomplete nail (L 12mm) with a circular head D 20mm. Shank has a circular cross-section (D 4mm). It is probably part of a clench nail.

2569 context 351. Incomplete nail (L 19mm) with a circular head D 20mm. Shank has a circular cross-section (D 6mm). It is probably part of a clench nail.

2573 context 351. Incomplete clench nail (L 28mm).

2583 context 010. Clench nail (L 22mm) with an oval head 21mm × 20mm and a rove 25mm × 23mm, with an additional plate or rove (25mm × 20mm) riveted on the bottom.

2602 context 315. Clench nail (L 16mm) with a circular head D 5mm and an incomplete rove 18mm × 15mm. The distance from nail-head to rove is 7mm average (4mm–10mm).

2621 context 308. Incomplete clench nail (L 16mm) with a circular head D 20mm. Shank has a circular cross-section (D 4mm).

Phase 6

1433a context 357 (9.33E, 108.82N, 6.84OD). Incomplete clench nail (L 24mm) with a rove 28mm × 23mm. Shank has a circular cross-section (D 5mm).

1434 context 357 (9.17E, 109.86N, 6.90OD). Incomplete clench nail (L 20mm) with a rove 15mm × 15mm. Shank has a circular cross-section (D 3mm).

1485 context 367. Incomplete nail (L 20mm) with a circular head D 13mm. Probably part of a clench nail.

1502 context 367. Incomplete nail (L 24mm) with a circular head D 21mm. Shank has a circular cross-section (D 6mm). Probably part of a clench nail.

1518 context 367. Incomplete clench nail (L 22mm) with a rove 22mm × 15mm. The distance from nail-head to rove is 16mm.

1578 context 350. Clench nail (L 18mm) with an oval head 22mm × 17mm and a rectangular rove 30mm x 29mm. Shank has a circular cross-section (D 5mm). The distance from nail-head to rove was originally 16mm (Figure 15.4).

1648 context 367. Incomplete clench nail (L 18mm) with a rove 26mm × 26mm. Shank has a circular cross-section.

1652 context 367. Broken clench nail (L 28mm) without its head. The rove is rectangular (21mm × 18mm) and the shank was formerly circular in section.

2491 context 350 (6544). Incomplete clench nail (L 20mm) with a diamond-shaped head 32mm × 22mm and an incomplete shank circular in section.

Phase 7

1013 context 022 (11.7E, 113.00N). Incomplete clench nail (L 27mm) with an incomplete rove 20mm × 18mm.

1058 context 303 (7.42E, 105.46N, 6.45OD). Incomplete clench nail (L 24mm) and rove 20mm × 20mm.

1106 context 316 (9.70E, 111.50N, 5.87OD). Clench nail (L 15mm) with a circular rove D 20mm. The head is circular (D 14mm) and the distance between nail-head and rove is 5mm (Figure 15.4).

1167 context 311 (9.20E, 106.40N, 6.49OD). Incomplete nail (L 28mm), probably a clench nail.

1168 context 311 (9.70E, 106.10N, 6.33OD). Incomplete clench nail (L 43mm) with a rove 35mm x 27mm. The distance between its missing nail-head and rove is 30mm.

1170 context 327. Incomplete clench nail (L 48mm) with a rove 29mm × 26mm. The distance between its missing nail-head and rove is 21mm.

1181 context 330 (10.29E, 109.69N, 6.75OD). Clench nail (L 21mm) with a diamond-shaped rove 30mm × 23mm. The head is circular (D 18mm), as is the cross-section through the shank (D 5mm), and the distance between nail-head and rove is 14mm.

1182 context 330 (10.23E, 110.57N, 6.77OD). Incomplete clench nail (L 36mm). Shank has a circular cross-section (D 5mm). The distance from nail-head to rove is 20mm.

1183 context 330 (10.26E, 110.63N, 6.77OD). Incomplete clench nail (L 28mm). Shank has a circular cross-section (D 4mm). The distance between nail-head and rove is 20mm.

1187 context 330 (10.26E, 110.47N, 6.72OD). Incomplete clench nail (L 20mm, D 2mm) with a rove 20mm × 18mm. The distance between missing nail-head and rove is 8mm.

1192 context 311 (7.90E, 103.30N, 6.24OD). Clench nail (L 29mm) with an incomplete rove. Shank has a circular cross-section (D 6mm–4mm).

1200 context 200. Incomplete clench nail (L 15mm) with an off-centre, oval head 30mm × 20mm. Shank has a circular cross-section (D 5mm).

1201 context 200 (9.80E, 106.50N, 6.31OD). Incomplete clench nail (L 12mm) and diamond-shaped rove 21mm x 19mm. Shank has a circular cross-section (D 5mm).

1205 context 200 (13.00E, 104.20N). Probable clench nail (L 36mm) with an oval head 22mm × 18mm. Shank has a circular cross-section (D 5mm). The distance from nail-head to damaged rove is 24mm.

1221 context 311. Large clench nail (L 42mm) with a circular head D 14mm, with a large diamond-shaped rove (originally 40mm × 32mm). The distance from nail-head to rove is 27mm (22mm–40mm).

1226 context 200 (8.68E, 103.60N, 6.16OD). Incomplete clench nail (L 21mm) with an oval head 28mm × 25mm. Shank has a circular cross-section (D 6mm).

1232 context 311. Incomplete clench nail (L 14mm) and rove (broken but probably diamond-shaped).

1406 context 322. Incomplete nail (L 16mm). Shank has a circular cross-section (D 5mm). Probably an incomplete clench nail.

1407 context 322. Incomplete clench nail (L 15mm). Shank has a circular cross-section (D 5mm).

1408 context 322. Incomplete clench nail (L 22mm). Shank has a circular cross-section (D 5mm).

1451 context 009 (14.65E, 110.30N, 6.77OD). Probably an incomplete nail (L 11mm). Shank has a circular cross-section (D 4mm). Possibly part of a clench nail.

1459 context 359 (9.40E, 107.10N, 6.37OD). Incomplete clench nail (L 28mm). Shank has a circular cross-section (D 3mm). The distance from nail-head to rove is 15mm.

1566a context 204. Incomplete clench nail (L 21mm) with a circular head D 19mm. Shank has a circular cross-section (D 5mm).

1580 context 322. Incomplete clench nail (L 21mm) with a rectangular rove 22mm x 20mm. Shank has a circular cross-section.

1583 context 316. Incomplete nail (L 32mm), probably a clench nail.

1591 context 209. Incomplete clench nail (L 22mm).

1597 context 209. Broken clench nail (L 20mm) with a rove 20mm x 20mm. Shank has a circular cross-section (D 5mm).

2521 context 009. Clench nail with a circular nail-head D 15mm and a square rove 30mm × 29mm. Shank has a circular cross-section (D 5mm). The distance from nail-head to rove is 25mm.

Phase 8

1045 context 054. Clench nail (L 50mm) with a rove 30mm × 25mm. Shank has a circular cross-section (D 5mm). The distance between nail-head and rove is 11mm.

1050 context 054. Incomplete clench nail shank (L 23mm) and diamond-shaped rove 31mm × 25mm. Shank has a circular cross-section (D 3mm).

1080 context 054 (12.90E, 111.28N). Broken clench nail (L 10mm) with a rove 20mm × 20mm. The nail is sub-square in cross-section (5mm x 5mm).

1083a context 054 (12.80E, 111.20N). Incomplete clench nail (L 15mm) with a diamond-shaped rove 30mm x 28mm. Shank has a square cross-section (4mm × 4mm).

1083b context 054 (12.80E, 111.20N). Incomplete clench nail shank (L 23mm). Shank has a circular cross-section (D 5mm).

1266 context 034. Incomplete clench nail (L 50mm) with an incomplete diamond-shaped rove. The distance from rove to former nail-head is 41mm. There are another two incomplete clench nails adhering to this nail. One is 27mm long, the other is 10mm long.

1515 context 106 (17.62E, 108.85N, 6.56OD). Incomplete clench nail (L 27mm) with a rove 23mm × 22mm.

2576 context 034. Clench nail (L 28mm) with an oval head 20mm

× 15mm and a rove 17mm × 14mm. Shank has a circular cross-section (D 3mm). The distance from nail-head to rove position is 20mm.

2582 context 003. Unidentified fragment (L 17mm, W 15mm, Th 6mm), probably a broken clench nail-head.

Unstratified

2594 context 001. Incomplete clench nail (L 34mm) with a rove 24mm × 22mm. Shank has a circular cross-section (D 4mm).

Roves

Phase 1

1166 context 323. Rove (21mm × 17mm) with a square hole (5mm × 5mm).

1847 context 608. Large rove (26mm × 26mm) with a circular hole (D 7mm).

1862 context 608. Rove (28mm × 20mm) with a sub-rectangular hole (6mm × 5mm).

1863 context 608. Rove (20mm × 17mm) with an oval hole (6mm × 4mm).

1865 context 608. Rove (20mm × 18mm) with a sub-square hole (6mm × 6mm).

1866 context 608. Rove (20mm × 17mm) with an off-centre circular hole (D 6mm).

2128 context 624. Rove (33mm × 20mm) with a semi-circular hole (D 9mm).

2224 context 580. Rove (17mm × 15mm) with a circular hole (D 4mm).

2322 context 596. Incomplete large rove (25mm × 28mm) broken across its square hole (5mm × 5mm) and adhering to another plate fragment.

2327 context 588. Rove (20mm × 18mm) with a square hole (5mm × 5mm).

2337 context 607. Rove (18mm × 18mm) and a broken-off clench nail with a square cross-section (5mm × 5mm).

2363 context 707. Incomplete rove (20mm × 18mm) broken off through the square hole (4mm × 4mm).

2375 and 2376 context 607. Incomplete rove (originally 26mm × 20mm) with a broken hole.

2377 context 607. Incomplete large rove (30mm × 17mm) broken through the circular hole (D 6mm).

2378 context 607. Incomplete rove (22mm × 16mm). Its hole was probably square.

2387 context 603. Rove (24mm × 22mm) with a circular hole (D 5mm).

2497 context 321. Rove (20mm × 20mm).

2675 context 751. Incomplete plate fragment (L 20mm, W 13mm, Th 7mm), probably a diamond-shaped rove.

2764 context 321. Incomplete rove (16mm × 14mm).

Phase 2

1213 context 332. Rove (30mm × 19mm) with a clench nail broken off in its circular hole (D 6mm).

1214 context 332. Incomplete rove (18mm × 12mm) with a circular hole (D 5mm).

1240 context 339 (14.44E, 112.66N, 6.29OD). Rove (28mm × 21mm) with a circular hole (D 4mm).

1807 context 600. Incomplete rove (21mm × 12mm) with a clench nail through its hole (D 5mm).

1952 context 600. Rove (24mm × 24mm) with a circular hole (D 6mm).

2112 context 618. Incomplete rove (24mm × 17mm) with a circular hole (D 6mm).

2124 context 618. Rove (17mm × 17mm) with a circular hole (D 4mm).

2131 context 484. Incomplete rove (20mm × 11mm) broken at the hole (D 6mm).

2226 context 572. Incomplete rove (20mm × 10mm) with a sub-square hole (D 4mm).

2293 context 582. Rove (24mm × 30mm) with an off-centre circular hole (D 7mm).

2310 context 582. Rove (21mm × 23mm) with an off-centre circular hole (D 5mm).

2316 context 618. Rectangular rove (23mm × 22mm) with a circular hole (D 6mm).

2347 context 453. Rove (28mm × 24mm) with a rectangular hole (5mm × 4mm).

2351 context 582. Rove (25mm × 22mm) with a circular hole (D 5mm).

2352 context 582. Incomplete rove (originally 24mm × 22mm) with a broken circular hole (D 6mm).

2674 context 622. Rove (28mm × 23mm).

Phase 3

1136 context 319. Incomplete rove (18mm × 15mm) broken across its circular hole (D 5mm).

1199 context 328 (14.45E, 114.35N, 5.84OD). Rove (20mm × 20mm) with a clench nail broken off in it.

1236 context 333. Diamond-shaped rove (38mm × 26mm).

1524a context 319. Rove (26mm × 18mm) with a sub-square hole (8mm × 8mm).

1524b context 319. Rove (21mm × 17mm) with a square hole (5mm × 5mm).

1528 context 319. Rove (17mm × 16mm) with a circular hole (D 5mm).

1722 context 528. Rove (20mm × 16mm) with a circular hole (D 6mm).

1746 context 528. Rove (20mm × 18mm) with a circular hole (D 6mm).

1772 context 432. Large but incomplete rove (30mm × 30mm) with a clench nail within its circular hole (D 9mm).

1849 context 443. Incomplete rove (originally 20mm × 19mm) with a formerly rectangular hole (4mm × 3mm).

1852 context 443. Broken rectangular plate, probably a rove (20mm × 12mm).

2018 context 443. Rove (22mm × 17mm) with a circular hole (D 6mm).

2033 context 472. Rove (27mm × 20mm) with an oval hole (6mm × 4mm).

2135 context 443. Rove (21mm × 19mm) with a circular hole (D 4mm).

2232a context 454 (7060). Incomplete rove (17mm × 15mm) with a square hole (5mm × 5mm).

2278 context 459. Rove (22mm × 19mm) with a circular hole (D 5mm).

2279 context 459. Rove (20mm × 20mm) with a clench nail broken off in it.

2300 context 459. Rove (20mm × 15mm) with the clench nail broken off in it. There is wood grain on one side.

2313 context 701 (7617). Incomplete rove (originally 20mm × 20mm) with the clench nail broken off in the incomplete hole (D 3mm).

2366a context 459 (7225). Incomplete small rove (originally 15mm × 15mm) broken through its square hole (4mm × 4mm).

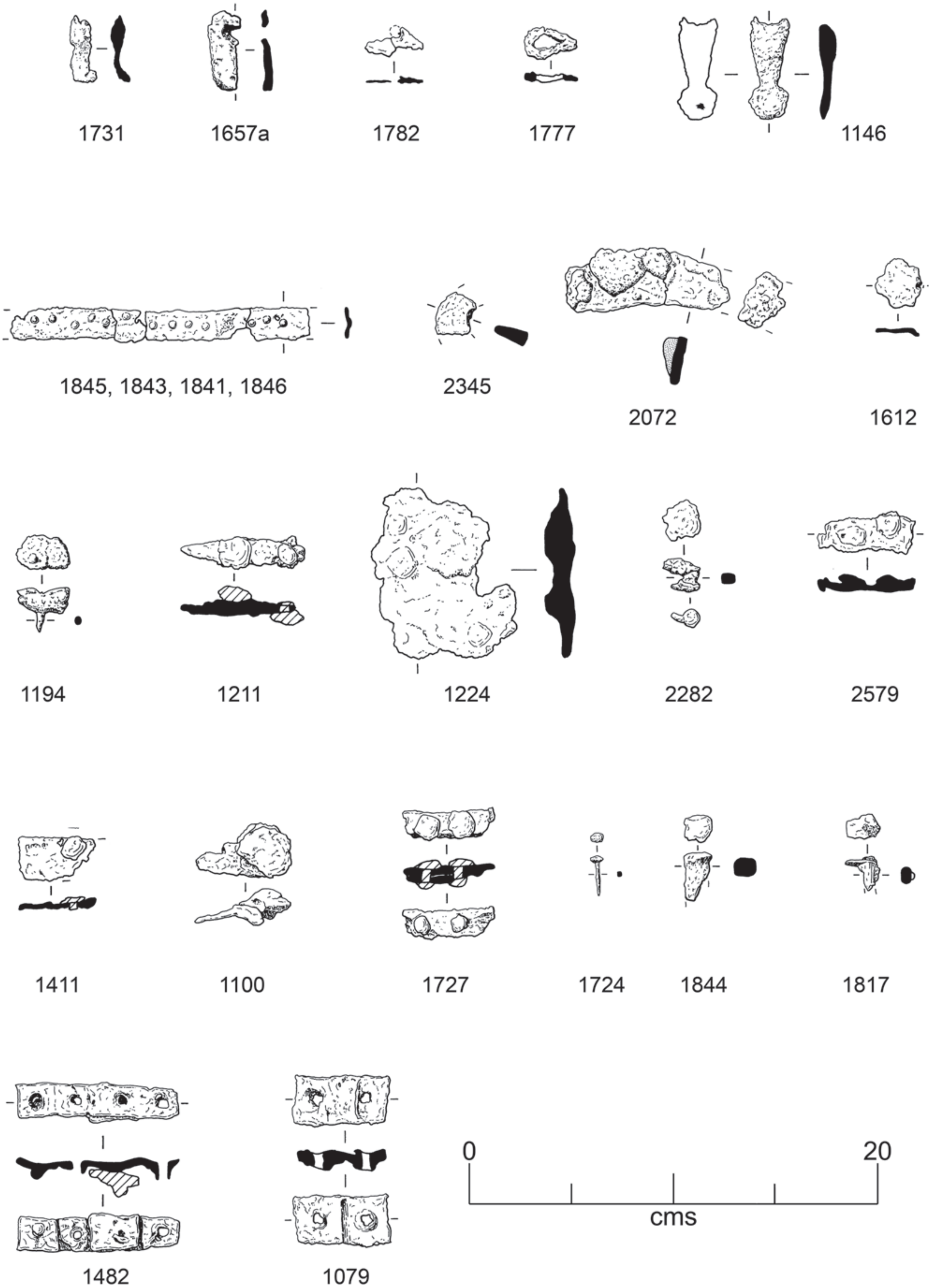

Figure 15.3. Iron fittings, plates and strips

2438 context 319. Rove (18mm × 16mm) with an oval hole (5mm × 3mm).
2447 context 528. Incomplete rove (17mm × 12mm) with a circular hole (D 4mm).
2558 context 443. Rectangular plate (L 22mm, W 15mm, Th 4mm), probably a broken rove.
2630 context 701 (7604). Rove (22mm × 20mm).

Phase 4

1113 context 317. Incomplete rove (21mm × 17mm) with a circular hole (D 4mm).
1118 context 317. Rove (26mm × 24mm) with a clench nail broken off in it.
1122 context 317. Rove (22mm × 20mm) with a circular hole (D 5mm).
1123 context 317. Diamond-shaped rove (30mm × 25mm) with a circular hole (D 4mm) in which a clench nail has broken off.
1514 context 358. Rove (24mm × 23mm) with a circular hole (D 5mm).
1516 context 366. Incomplete rove (18mm × 13mm) broken across its circular hole (D 4mm).
1603 context 384. Fragment of a rove (18mm × 10mm).
1606 context 384. Small rectangular plate or rove (17mm × 11mm) with an off-centre hole (D 3mm) and 'chad' (Figure 15.4).
1610 context 384. Incomplete rove (25mm × 15mm) broken across its circular hole (D 5mm).
1834 context 442. Incomplete rove (originally 24mm × 20mm) with a circular hole (D 4mm).
1937 context 126. Rove (26mm × 21mm) with a circular hole (D 5mm).
1976 context 504. Rove (27mm × 16mm) with a circular hole (D 4mm).
1988 context 440. Rove (21mm × 20mm) with a circular hole (D 7mm).
2025 context 555 (7337). Rove (21mm × 21mm) with a broken-off clench nail (D 6mm) and wood grain on both sides.
2081 context 569. Incomplete rove (20mm × 10mm), possibly oval, broken across the circular hole (D 5mm).
2106 context 565 (7482). Rove (25mm × 22mm) with a circular hole (D 5mm) and a broken clench nail (L 25mm) lying across it.
2225 context 569. Incomplete diamond-shaped rove (originally 40mm × 26mm) with a sub-square (6mm × 6mm) sectioned clench nail broken off in it and wood grain on its upper side.
2241 context 552. Rove (16mm × 12mm) with a circular hole (D 4mm).
2247 context 552. Incomplete plate (L 28mm, W 12mm, Th 3mm), probably a rove.
2249 context 544 (7141). Rove (24mm × 24mm) with a sub-square hole (5mm × 5mm).
2255 context 126 (7059). Incomplete rove (25mm × 17mm) with a circular hole (D 5mm).
2268 context 556 (7398). Rove (23mm × 20mm) with a circular hole (D 6mm).
2272 context 565. Incomplete rove (25mm × 24mm).
2284 and 2145 context 569. Rove (20mm × 19mm) with a circular hole (D 4mm).
2289 context 555 (7352). Square rove (17mm × 17mm) with a circular hole (D 4mm).
2338 context 504 (7223). Rove (20mm × 18mm) with a circular hole (D 4mm).
2365 context 544 (7154). Diamond-shaped rove (originally 42mm × 24mm) with a circular hole (D 7mm).
2451 context 317. Incomplete rove (18mm × 16mm) with a circular hole (D 4mm).
2456 context 430. Rove (26mm × 22mm) with a circular hole (D 5mm).
2556 context 565. Small rectangular plate (L 18mm, W 14mm, Th 3mm), probably a broken rove, adhering to a bone.
2587 context 569. Rove (21mm × 17mm) with a circular hole (D 3mm).
2653 context 370 (6728). Rove (24mm × 22mm) with wood grain on one side.
2666 context 539 (7447). Rove (24mm × 22mm) with the clench nail broken off within it.
2671 context 554 (7313). Rove (22mm × 20mm).
2672 context 576. Incomplete rove (19mm × 15mm) broken across the hole.

Phase 5

1054 context 306 (14.94E, 114.16N). Rove (22mm × 15mm) with a sub-square hole (4mm × 4mm).
1068 context 308. Rove (22mm × 22mm) with a circular hole (D 4mm).
1088 context 308. Rove (20mm × 18mm) with a circular hole (D 4mm).
1091 context 308 (13.65E, 114.70N, 6.30OD). Incomplete rove (22mm × 16mm) with a square hole (4mm × 4mm).
1093 context 308 (13.80E, 112.95N, 6.30OD). Rove (23mm × 19mm) with a circular hole (D 5mm).
1495 context 010. Rove (24mm × 16mm) with a circular hole (D 4mm).
1498 context 351. Rove (26mm × 21mm) with a circular hole (D 8mm).
1504 context 351. Incomplete rove (16mm × 18mm) with a circular hole (D 5mm).
1507 context 010. Incomplete rove (25mm × 19mm).
1567 context 386. Rove (21mm × 17mm) with a circular hole (D 5mm).
1582 context 351. Rove (26mm × 26mm).
1599 context 219. Half a rove (18mm × 11mm) with a square hole 4mm x 4mm (Figure 15.4)
1638 context 308. Incomplete rove (originally 18mm × 17mm).
1656 context 503 (6959). Rove (27mm × 22mm) with a circular hole (D 4mm).
1687 context 507. Rove (22mm × 21mm) with a broken-off round-sectioned nail shank (L 15mm, D 4mm) through it (Figure 15.4).
1715 context 313. Incomplete strip (L 36mm, W 14mm, Th 2.5mm), probably a broken diamond-shaped rove.
1810 context 441. Incomplete rove (27mm × 14mm) with a circular hole (D 3mm) (Figure 15.4).
1838 context 389. Incomplete rove (originally 18mm × 17mm) with a circular hole (D 5mm).
1921 context 534 (10.58E, 111.55N, 5.94OD). Rove (29mm × 24mm) with a circular hole (D 5mm).
1925 context 547. Rove (21mm × 19mm) with an off-centre, broken circular hole (D 6mm).
2240 context 010. Incomplete rove (24mm × 15mm) broken across the hole.
2248 context 503 (7287). Rove (22mm × 20mm) with a circular hole (D 6mm).
2414 context 315. Rove (22mm × 20mm) with a circular hole (D 6mm).
2417 context 315. Incomplete rove (23mm × 15mm).

2446 context 308. Incomplete plate (L 24mm, W 22mm, Th 2mm), probably a broken rove.
2458 context 010. Rove (22mm × 22mm) with a circular hole (D 4mm).
2468 context 313. Broken rove (22mm × 15mm) with a rectangular hole.
2506 context 306 (6073). Rove (30mm × 28mm) with a probably rectangular central hole (4mm × 2mm).
2548 context 351. Incomplete rove, broken in half (21mm × 14mm) with a round hole (D 3mm).
2568 context 351. Diamond-shaped rove (25mm × 19mm) with a circular hole (D 5mm).
2570 context 351. Incomplete rove (originally 22mm × 15mm) with a circular hole (D 5mm).
2572 context 351. Large rove (25mm × 22mm) with a square hole (4mm × 4mm).
2599 context 308. Incomplete pierced plate (15mm × 8mm), probably a broken rove.
2603 context 315. Incomplete rectangular plate (13mm × 10mm), probably a rove.
2629 context 386. Rove (22mm × 20mm).

Phase 6

1401 context 350. Large rove (35mm × 23mm) with a sub-square hole (8mm × 8mm).
1669 context 394. Rove (22mm × 18mm) with a square hole (4mm × 4mm).
1671 context 394. Broken rectangular plate (L 25mm, W 24mm, Th 3mm), probably a snapped rove.
2430 context 367. Incomplete rove (22mm × 22mm originally) with a circular hole (D 8mm).
2525 context 367. Rove (40mm × 26mm) with a broken-off nail shank (L 7mm) circular in section (D 3mm).

Phase 7

1025 context 036. Rove (24mm × 20mm) with a circular hole (D 8mm).
1057 context 303 (7.31E, 105.41N, 6.46OD). Rove (24mm × 22mm) with a circular hole (D 5mm) and wood grain imprints on both sides.
1059 context 303 (7.50E, 107.10N, 6.05OD). Diamond-shaped rove (36mm × 25mm) with a circular hole (D 8mm).
1114 context 200. Rove (24mm × 22mm) with a circular hole (D 4mm).
1162 context 322. Diamond-shaped rove (25mm × 23mm) with a broken clench nail in its circular hole (D 4mm).
1171 context 329. Rove (17mm × 16mm) with a broken clench nail in its circular hole (D 4mm).
1173 context 330. Rove (26mm × 24mm) with a broken-off clench nail of circular cross-section (D 4mm).
1174 context 330. Incomplete rove (16mm × 14mm) with a rectangular hole (4mm × 3mm).
1179 context 330 (10.42E, 110.20N, 6.81OD). Rove (21mm × 21mm) with a circular-sectioned (D 3mm) clench nail broken off in it.
1180 context 330 (10.20E, 109.67N, 6.77OD). Rove (19mm × 15mm) with a clench nail broken off.
1185 context 330 (10.30E, 110.14N, 6.80OD). Diamond-shaped rove (35mm × 28mm) with a square hole (7mm × 7mm).
1186 context 330 (10.57E, 110.75N, 6.83OD). Rove (20mm × 19mm) with a square-sectioned (3mm × 3mm) clench nail broken off in it.
1220 context 311. Rove (20mm × 17mm) with a circular hole (D 5mm).
1402 context 316. Rove (21mm × 21mm) with a square hole (5mm × 5mm).
1403 context 316. Rove (23mm × 20mm) with a circular hole (D 4mm).
1414 context 204. Rove (28mm × 23mm) with a circular hole (D 4mm).
1460 context 359. Diamond-shaped rove with curved edges (28mm × 22mm) with a central hole (D 4mm).
1462 context 009 (13.65E, 111.75N, 6.80OD). Incomplete rove (22mm × 13mm) split through its circular hole (D 8mm).
1482 context 209 (7.29E, 101.00N, 6.01OD). Complete strip of four prepared roves (L 80mm, W 16mm; *i.e.* each rove is 20mm × 16mm) with punched holes (D 4mm). Adhering to the strip's underside is another prepared but detached rove (24mm × 19mm). The 'chads' all remain attached
1566b context 204. Rove (33mm × 20mm) with a central hole (D 3mm).
1579 context 372. Probable rove of diamond-shaped form (34mm × 22mm), incomplete but with a central hole originally 7mm dia. There is an imprint of wood on the head of the rove but this is probably not part of the original object.
1605 context 209. Rove (28mm × 24mm).
1680 context 209. Damaged rove (originally 26mm × 21mm) with a circular hole (D 5mm).
1732 context 209. Rove (19mm × 18mm) with a circular hole (D 5mm).
2246 context 205 (6667). Diamond-shaped rove (31mm × 22mm) with a broken-off clench nail in the hole (D 5mm).
2395 context 209. Incomplete rove (originally 24mm × 18mm) with a circular hole (D 5mm).
2614 context 020. Rove (21mm × 20mm) with a square hole (5mm × 5mm).
2665 context 205 (6889). Rove (24mm × 22mm).

Phase 8

1015 context 004 (9.20E, 99.00N). Incomplete rove (15mm × 13mm) broken across the circular hole (D 5mm).
1042b context 058 (13.82E, 106.71N). Rove (29mm × 22mm) with the clench nail broken off in its hole (D 4mm).
1079 context 054 (12.65E, 111.10N). Strip (L 44mm, W 22mm, Th 3mm) of two pre-prepared roves (one measuring 23mm × 22mm and the other 20mm × 22mm). There is a 1mm–2mm-wide punched line between them and each rove's hole (D 5mm and D 6mm) has already been punched (Figure 15.3).
1178 context 063 (11.72E, 107.11N, 6.16OD). Incomplete rove (21mm × 12mm) broken across its circular hole (D 5mm).
1439 context 355 (10.34E, 108.20N, 6.67OD). Diamond-shaped rove (33mm × 31mm) with a circular hole (D 7mm).
1440 context 355. Rove (24mm × 24mm) with a circular hole (D 4mm).
1555 context 113. Rove (27mm × 22mm) with a circular hole (D 8mm).
2577 context 034. Two roves (30mm × 20mm and 30mm × 18mm), fused together.
2580 context 003. Rove (20mm × 17mm) with an oval hole (5mm × 3mm).

Unstratified

2590 context 001. Incomplete rove (24mm × 12mm) broken across the circular hole (D 5mm).

15.11 Iron fittings

There are fragments of 52 fittings from the site. Most are too small and incomplete to gain much idea of their original shape and dimensions and thus of the artefacts of which they formed part. In comparison to the wide range of fittings from urban settings such as Dublin, York and Winchester, this is a small assemblage, limited in variety.

Handles, mounts and hinge fittings

Three pieces of ironwork might have been components of wooden boxes or chests. There may well be more such items, but the extent of fragmentation prevents further identifications. A broken handle-hinge fitting (SF 1042a from 058 in phase 8) was originally riveted to a small box or chest. Two items (SF 1146 in 323 and SF 2466 in 313) are broken fragments of a mount whose circular terminals are tinned with a copper alloy-inlaid lattice pattern. They come from overlapping layers but of different phases (phase 2 and phase 5) and SF 2466 in 313 (phase 5) is most likely residual.

Two further artefacts listed and counted in 'Riveted fittings' below, could possibly be part of a small hinge fitting (SF 2436) and a mount for a box or chest (SF 1211).

Phase 1

1146 context 323. Incomplete pierced fitting made from a tapered plate (L 59mm, W 19mm–7mm, Th 4mm) ending in a circle (D 17mm). The plate has broken at its centre where it was cut by a large, presumably circular hole (D 12mm). The circular end has a small patch of copper-alloy inlay, forming a lattice pattern (Figure 15.3). This artefact is presumably a mount for a wooden box or chest. It is matched by SF 2466, which is the same shape and has all of its lattice decoration surviving. The two fragments may have formed a fitting 102mm long with a central circular hole (D 14mm). (This artefact is also listed in the copper-alloy artefacts in Chapter 13).

Phase 5

2466 context 313. Incomplete tapering strip (L 48mm, W 19mm–8mm, Th 12mm) with a roundel at one end. It is decorated with an elaborate copper-alloy inlay of latticed lines across its entire surface. This is possibly half of a chest fitting. It is matched by SF 1146, which is the same shape and has only a small portion of the lattice decoration surviving. The two fragments might have formed a fitting 102mm long with a central circular hole (D 14mm). (This artefact is also listed in the copper-alloy artefacts in Chapter 13).

Phase 8

1042a context 058 (13.82E, 106.71N). Incomplete handle-hinge fitting made of an oval plate (L 24mm, W 15mm, Th 2mm) attached to an incomplete curved rod (D 5 mm). There are two circular rivets (D 6mm) through the plate's ends. This is probably the broken handle of a small box or chest.

Pierced fittings

There are 13 broken pieces of iron which have been pierced, presumably to hold rivets. In phase 2 there is a plate fragment with a rivet hole (SF 1258 in 339). In phase 3 an L-shaped strip is broken across its hole (SF 1731 in 319) and another broken strip has a circular hole (SF 2312 in 701). In phase 4, two curved strips (SF 2449 and SF 2450 from 317) are probably fragments of the same riveted, ring-shaped object. There are seven pieces from phase 5: a plate fragment with a punched hole against one edge (SF 1612 in 118), a broken triangular plate with a square hole in one corner (SF 1622 in 313), a broken strip with a semi-circular rivet hole (SF 1657a in 313), two broken strips with punched holes (SF 2571 and SF 2574 in 351) probably from the same item, a broken, pierced loop (SF 1777 in 533) and a broken triangular plate broken across a circular hole (SF 1782 in 533). A pierced triangular plate (SF 2607 in 200 from phase 7) may be a rove fragment but is probably too large for that.

Phase 2

1258 context 339. Plate fragment with rivet hole.

Phase 3

1731 context 319. Incomplete pierced fitting (L 33mm, W 9mm, Th 2mm), broken at one end across the hole. The other end is L-shaped and broken-off (Figure 15.3).

2312 context 701 (7617). Incomplete strip (L 29mm) with a circular hole (D 2mm) towards one end.

Phase 4

2449 context 317. Incomplete curved strip (L 19mm, W 8mm, Th 2mm), possibly part of the same ring-shaped object as SF 2450.

2450 context 317. Incomplete curved strip (L 25mm, W 10mm, Th 2mm) with a rivet stem (D 3mm) through one end. It is possibly part of the same ring-shaped object as SF 2449. It may have two punched circles (D 2mm at 7mm centres).

Phase 5

1612 context 118. Small incomplete plate (L 24mm, W 21mm, Th 1mm) with a punched hole (D 2mm) against one edge (Figure 15.3).

1622 context 313. Incomplete triangular plate 41mm, W 31mm, Th 2mm) with a square hole in one corner (4mm × 4mm) and an unidentified square lump (14mm × 14mm) on one surface.

1657a context 313. Incomplete strip (L 39mm, W 12mm, Th 4mm) with a semi-circular indentation (D 6mm) towards one end where a rivet has been forced through (Figure 15.3).

1777 context 533. Incomplete pierced fitting in the shape of a loop (L 24mm, W 15mm, Th 1.5mm) (Figure 15.3).

1782 context 533. Incomplete triangular plate fragment (L 15mm, W 10mm, Th 2mm) in two pieces, which has broken across a circular hole (D 4mm). It may be the tip of a pierced fitting (Figure 15.3).

2571 context 351. Incomplete strip (L 27mm, W 17mm, Th 2mm) with two punched holes (D 3mm at 15mm centres). It has broken across one of the holes. It is probably part of the same artefact as SF 2574.

2574 context 351. Incomplete strip (L 19mm, W 16mm, Th 2mm) with a punched hole (D 1.5mm). It is probably part of the same artefact as SF 2571.

Phase 7

2607 context 200. Incomplete, pierced triangular plate (L 34mm, W 22mm, Th 2mm), broken across its circular hole (D 4mm). It is either a fragment of pierced fitting or possibly a very large diamond-shaped rove (originally 50mm × 22mm).

Unpierced fittings

There are four unpierced iron items which may be fittings. From phase 2, a broken segment of curved plate could be part of a small octagonal disc (SF 2345 in 579). In phase 3, a broken tapered strip, curved at one end (SF 2642 from 701), might be a fitting or a bent tang. From phase 4, an angled and curved strip (SF 2258 from 504) may be a broken handle or clamp. Two pieces of a large, broken tapered strip with a small rectangular tongue (SF 2072 in 553) may also be part of a fitting.

Phase 2

2345 context 579. Incomplete segment of a curved plate (L 21mm, W 19mm, Th 8mm–2mm) which may be part of an octagonal disc (original D 40mm). The plate is 8mm thick at its centre and 2mm thick at its edges) (Figure 15.3).

Phase 3

2642 context 701 (7616). Incomplete tapered strip, curved at one end (L 40mm, W 14mm–12mm, Th 2mm). Probably a fitting.

Phase 4

2072 context 553. Incomplete tapered rectangular strip in two pieces (overall L 93mm but one fragment is L 43mm, W 27mm–21mm, Th 1mm and the other is L 47mm, W 24mm–20mm, Th 1mm). One end appears to be complete and has a small rectangular tongue (L 21mmm, W 11mm) (Figure 15.3).

2258 context 504 (7179). Incomplete rectangular strip (L 37mm, W 12mm, Th 2mm) which has one end intact, bent at an angle to the curved remainder of the strip. It is possibly a broken handle or clamp.

Unpierced fittings with protrusions

A 14mm-wide strip, ornamented with a line of punchmarks or protrusions down its centre, was found in four pieces (SFs 1841, 1843, 1845 and 1846) within a pit fill (608) in phase 1 and might have formed an ornamental band for a wooden box or container. These fragments are recorded in Table 15.1 as a single artefact.

Phase 1

1841, 1843, 1845, 1846 context 608. Incomplete unpierced fitting, consisting of four conjoining fragments of strip (reconstructed L 142mm, W 14mm, Th 2mm) broken at both ends and ornamented with 17 punchmarks (D 3mm) at *c*.9mm intervals down its centre (Figure 15.3).

Riveted fittings

There are 22 broken iron items which have been riveted. A small number of other riveted fragments present in the assemblage are identified as cauldron or bowl fragments; these are listed in section 15.9, above, and are not therefore included in the total of 22 items in this section.

More riveted fittings come from phase 5 than any other phase.

- In phase 1 there is a strip broken through its rivet hole (SF 2362 from 715), a riveted strip (SF 2673 in 580) and a pair of broken plates sandwiched together (SF 2326 from 596).
- From phase 2 there are a riveted bar fragment (SF 2344 in 579), a riveted strip (SF 2309 in 582), a riveted tapered strip (SF 1211 in 332 – possibly a mount for a wooden box) and a riveted L-shaped plate fragment (SF 1224 in 334).
- In phase 3, six conjoining fragments of two plates are held together by three rivets (SF 2311 in 701) and a tapered strip with an incised line along one side is riveted (SF 2299 in 459) and may possibly be a scale tang.
- From phase 4, two broken plates are riveted together (SF 2631 in 555). A tapered strip with a rivet hole at the thin end (SF 2460 in 504) could possibly be a scale tang (see 'Strips and bars' below).
- Ten items are from phase 5: a broken plate riveted through its corner (SF 1930 in 547), a broken strip riveted through one end (SF 2579 in 010), a riveted plate fragment (SF 2615 in 010), a riveted strip bent over at one end (SF 1066 in 308), a riveted plate fragment (SF 1100 in 309), two broken plates riveted together (SF 2457 in 419), a broken rectangular plate with an off-centre rivet (SF 1411 in 351), a broken riveted strip with two rivets (SF 1916 in 533) and a broken, tapered plate fragment with a rivet through its end (SF 2238 in 534). A rectangular plate with a triangular flap, wrapped back on itself and riveted (SF

2436 in 397), could possibly be part of a small hinge fitting.
- From phase 6 there is a riveted piece of plate with wood grain on the rivet head (SF 2549 in 398).

Most of the rivets have circular heads although that in SF 1411 has a rectangular head. The diameter of the heads may reach 26mm (SF 1100) and the stems may be as little as 2mm in diameter (SF 2457). As with the broken pierced fittings, the pieces are too fragmentary to reconstruct the full artefacts.

Phase 1

2326 context 596. Two pieces of incomplete plate (L 38mm, W 22mm, Th 2mm–4mm and Th 3mm), sandwiched together.

2362 context 715. Incomplete riveted strip (L 33mm, W 14mm–16mm, Th 2mm). The strip is broken off at one end through the rivet hole (D 7mm).

2673 context 580. Incomplete riveted rectangular strip (L 12mm, W 14mm, Th 1.5mm). The rivet is 5mm long with a circular cross-section (D 2mm.).

Phase 2

1211 context 332 (13.05E, 113.30N, 5.52OD). Incomplete tapered strip (L 55mm, W 11mm–2mm, Th 2mm) with a rivet (L 10mm, with a circular head D 10mm) at the broken end. This is possibly a mount for a wooden box or chest (Figure 15.3).

1224 context 334 (13.40E, 113.00N, 6.00OD). Large incomplete L-shaped plate fragment (L 90mm, W 66mm, Th 1mm) with a square-sectioned rivet (4mm × 4mm) in one corner (Figure 15.3).

2309 context 582. Incomplete strip (L 24mm, W 16mm, Th 1mm) with a rivet (L 5mm, with an oval head 6mm × 4mm) through its centre.

2344 context 579. Rivet (L 14mm, W 6mm × 6mm) through an incomplete bar fragment (L 19mm, W 27mm, Th 13mm).

Phase 3

2299 context 459. Incomplete riveted and tapered strip (L 42mm, W 25mm–6mm, Th 4mm) which has an incised line along one of its long sides. The rivet (D 2mm) is at the tapered end. This is possibly a broken scale tang (see section 15.2 ‘Knives’, above).

2311 context 701 (7617). Six fragments of two incomplete plates (L 40mm, W 32mm, Th 2mm) sandwiched together by three rivets (each L 6mm, *c*. D 3mm).

Phase 4

2460 context 504. Incomplete tapering strip (L 45mm, W 12mm–9mm, Th 4mm) with a small rivet hole (D 2mm) at the tapered end. This is possibly a scale tang (see section 15.2 ‘Knives’, above).

2631 context 555 (7353). Fragment of two incomplete plates (L 40mm, W 20mm, Th 9mm) riveted together. The rivet (L 11mm, with a circular head D 5mm) has a circular cross-section (D 4mm).

Phase 5

1066 context 308. Incomplete pierced strip (L 40mm, W 11mm, Th 1.5mm), bent over at one end, with a rivet (L 9mm, with a head D 6mm) through its centre.

1100 context 309 (14.60E, 113.30N, 6.26OD). Incomplete plate (L 35mm, W 36mm, Th 2mm) attached to a rivet (L 18mm, with a circular head D 26mm) (Figure 15.3).

1411 context 351. One end of an incomplete 20mm-wide rectangular plate (L 38mm, W 20mm, Th 1mm) with a rivet (L 5mm, with a rectangular head 12mm × 8mm) off-centre towards one side and 20mm from the plate’s complete end (Figure 15.3).

1916 context 533. Incomplete riveted strip (L 58mm, W 23mm, Th 5mm) with two rivets spaced at 25mm centres (each L 16mm, D 10mm).

1930 context 547. Incomplete plate (L 42mm, W 40mm, Th 2mm) with a rivet (L 8mm, with a circular head D 12mm) through one corner.

2238 context 534. Incomplete tapered plate fragment (L 27mm, W 13mm–6mm, Th 1mm) with a rivet (D 3mm) through its tapered end.

2436 context 397. Incomplete rectangular plate (L 59mm, W 44mm, Th 5mm) with a triangular flap (L 40mm, W 30mm, Th 5mm) wrapped back on itself and riveted (rivet head D 10mm and shank 3mm).

2457 context 419. Two incomplete plates riveted together (L 15mm, W 9mm, Th 6mm and 4mm). The rivets are D 2mm with 6mm centres.

2579 context 010. Incomplete rectangular strip (L 45mm, W 15mm, Th 2mm) with a rivet (L 8mm, 10mm × 10mm square) through it near one end (Figure 15.3).

2615 context 010. Rivet (L 23mm) through an incomplete plate (Th 2mm).

Phase 6

2549 context 398. Riveted piece of plate (L 35mm, W 22mm, Th 5mm). The rivet is circular (D 18mm and L 19mm) and has a wood grain imprint on its head.

Rivets and studs

Most rivets or studs were found still attached to plate or strip fragments and to antler combs. Only two were found as isolated items. One is a dome-headed rivet (SF 1090 in 308) from phase 5. The other is a stud (SF 1194 from 330 in phase 7) with a diamond-shaped head. They are too large for combs and might have been used on iron or wooden items.

Phase 5

1090 context 308. Dome-headed rivet (L 15mm, with a circular head D 14mm).

Phase 7

1194 context 330. Stud (L 18mm, with a diamond-shaped head 25mm × 18mm) with a circular cross-section (D 3mm–4mm) (Figure 15.3).

Clench fastenings for furniture

Virtually all of the clench nails and roves can be considered on the basis of their size as deriving from boat timbers. However, three are too small to have been used as boat fittings.

A small clench fastener made from a bent-over tapered strip and secured by a tiny circular rove (SF 2282 in 504 from phase 4) is probably a furniture- or chest-fitting. From phase 7 there are two other unusual clench nails. One is a clench nail with a triangular-shaped rove (SF 1176 in 330) which also probably derives from an item of furniture or a door. The other nail with its rove (SF 2541 in 209) clasps a copper-alloy strip, sandwiched within which are the remains of what may be leather, perhaps surviving from a copper alloy-rimmed leather bucket.

Phase 4

2282 context 504 (7274). Small clench fastener made of a tapered strip (originally L 36mm, with a point at one end and a circle D 15mm at the other) which has been bent over and secured by a tiny circular rove (D 9mm). The distance between head and rove is 4mm. This is presumably a furniture fitting (Figure 15.3).

Phase 7

1176 context 330. Incomplete clench nail (L 17mm) and a triangular-shaped rove 26mm × 17mm. Shank has a circular cross-section (D 2mm). This is probably a furniture- or door-fitting rather than a boat nail.

2541 context 209. Clench nail (L 20mm) with a circular head D 13mm and a square rove (28mm × 28mm) clasping a folded-over copper-alloy strip (Th 3mm), on the fold of which is a small hole (D 2mm), possibly for suspension. Shank has a circular cross-section. There was an organic material (Th 6mm; possibly leather – there are no wood grain impressions) held between the folded copper alloy (thereby making a distance of 12mm between nail-head and rove). This is presumably a rim or binding which has been riveted for extra strength (Figure 15.4). (This artefact is also listed in the copper-alloy artefacts in Chapter 13).

Edge binding

There is a fragment of riveted, U-shaped edge binding (SF 1727) from 319 in phase 3.

Phase 3

1727 context 319. Incomplete U-shaped edge binding (L 44mm, W 11mm × 5mm, Th 2mm) with two rivets (L 9mm and L 10mm, with circular heads D 12mm) whose centres are 15mm apart (Figure 15.3).

Clasps

From phase 3 there is a small, folded-over clasp with two square plates (SF 2455 in 528). A butterfly-shaped clasp (SF 2404) comes from 430 in phase 4.

Phase 3

2455 context 528. Folded-over clasp of two small square plates (L 16mm, W 16mm, Th 3mm), attached by each of their corners. The gap between them is 5mm.

Phase 4

2404 context 430. Butterfly-shaped clasp (L 45mm, W 24mm–8mm, Th 2mm), slightly curved.

Loop

There is one iron loop, a rectangular-sectioned rod bent back on itself (SF 1971) from 440 in phase 4. Other loops in the assemblage are interpreted as cauldron fittings or pierced fittings, and are listed in those sections above.

Phase 4

1971 context 440. Loop (L 45mm, W 25mm) made from a rod rectangular in section (6mm × 4mm) and bent back on itself.

15.12 Nails

Nails are the commonest artefact type (*n*=356) from the site and are found in all phases. They are all broken except for 14 complete and three near-complete examples which come from a variety of contexts in all phases apart from phases 6 and 9. The assemblage consists of:

- 30 nails and fragments from phase 1,
- 21 from phase 2,
- 48 from phase 3,
- 78 from phase 4,
- 93 from phase 5,
- 15 from phase 6,
- 47 from phase 7,

Table 15.8. Shapes of non-clench nail-heads and cross-sections by phase

Phase	Nail-heads						Stem cross-sections			
	Circular	*Oval*	*Square*	*Rectangular*	*Rhombus*	*Domed*	*Round*	*Oval*	*Square*	*Rectangular*
1	3	3	1	0	0	0	2	0	2	3
2	1	0	0	0	0	0	0	0	0	2
3	4	3	0	2	0	1	2	1	11	1
4	14	4	1	3	1	0	1	0	25	5
5	17	8	1	2	0	1	2	0	30	18
6	4	2	0	1	0	0	0	0	5	5
7	4	3	0	0	0	1	0	0	16	2
8	1	2	1	0	0	1	0	0	2	1
9	0	0	1	0	0	0	0	0	1	0

- 14 from phase 8,
- four from phase 9,
- six unstratified from layer 001.

Among the nails are two tacks (SF 1947 in 600 in phase 2 and SF 1935a in 533 in phase 5) and two tiny nails (SF 1817 in 323 in phase 1 and SF 1724 in 528 in phase 3).

Nail-heads are mostly circular (*n*=48) and oval (*n*=25). Rectangular heads (*n*=8) and square heads (*n*=5) are rare, and there is only one example of a rhomboid head. All nail-heads are flat with the exception of four which are domed. There is no chronological patterning of nail-head shapes.

Sections of nail shanks are mostly square (*n*=92) or rectangular (*n*=37). Seven circular-sectioned shanks and one oval shank appear to be nails but could possibly be clench nails, which tend to be circular in section (Table 15.8).

Lengths of nails fall into two groups: tacks (15mm–20mm) and nails (30mm–71mm). Nine nails are at the small end of the range, between 28mm and 54mm. Seven nails are large, at over 61mm. A larger size of nail (over 71mm and usually under 90mm but up to 130mm) is entirely missing from the assemblage but otherwise the nails cover the range of lengths from Coppergate (Ottaway 1992: fig. 254). The shorter lengths of the Cille Pheadair nails could be due to more effective recycling and/or to iron being a scarce resource in the rural Western Isles.

The three near-complete nails measure: 28mm, 51mm, 61mm. Of the 14 complete nails, three fall into the tack category: 15mm, 19mm, 20mm. The remaining complete nails measure: 30mm, 37mm, 40mm, 43mm, 47mm, 54mm, 54mm, 66mm, 68mm, 71mm, 71mm.

Most of the broken nail-stems are straight and only 25 are recorded as bent, with one sawn through. Very few of the broken nail-stems are more than 40mm long. The absence of bent nails may be due to frequent breakage on the bend of the nail during or after its removal from the wood.

Wood grain is recorded from phase 1 (SF 1150 in 321, SF 2328 in 588), phase 2 (SF 2307 in 582), phase 3 (SF 2017 in 433), phase 4 (SF 2623 in 565), phase 5 (SF 1492 in 010; SF 1598 in 397), phase 6 (SF 1545 in 369) and phase 7 (SF 2564 in 205; SF 2433 in 209).

Phase 1

1139 context 321. Incomplete nail shank (L 12mm).
1142 context 321. Incomplete nail shank (L 37mm).
1143 context 321. Incomplete nail shank (L 22mm).
1150 context 321. Incomplete nail shank (L 44mm). There is wood grain along the lower 33mm of the shank.
1151 context 323. Incomplete nail shank (L 17mm).
1164 context 323. Incomplete nail shank (L 30mm).
1165 context 323. Incomplete nail shank (L 22mm).
1817 context 323. Stud or small nail (L 15mm, with an off-centre rectangular head 14mm × 11m) (Figure 15.3).
1818 context 323. Incomplete strip (L 24mm, W 6mm, Th 6mm), probably a broken nail shank.
1820 context 323. Incomplete nail-head or circular rove (originally D 25mm).
1822 context 323. Incomplete nail (L 32m) probably circular in cross-section (D 7mm).
1844 context 608. Incomplete bolt or thick nail (L 24mm, with a circular head D 15mm) and a shank which is rectangular in section (11mm × 10mm) (Figure 15.3).
1864 context 608. Incomplete strip with a tip (L 24mm, W 4mm, Th 4mm), probably a broken nail shank.
2028 context 444. Incomplete nail (L 20mm, with an off-centre oval head 25mm × 21mm).
2127 context 626. Incomplete nail (L 38mm).
2168 context 596. Incomplete nail (L 29mm, with a circular head D 28mm) with a square cross-section (8mm × 8mm).
2324 context 596. Incomplete nail shank (L 26mm) adhering to a small piece of slag.

2328 context 588. Incomplete nail shank (L 38mm) with wood grain on all sides.
2332 context 607. Incomplete bent nail (L 28mm, with a circular head D 12mm) which is circular in section (D 7mm) and is missing its tip.
2333 context 733. Incomplete nail shank (L 24mm).
2334 context 707. Incomplete nail (L 11mm, with an oval head 18mm × 16mm).
2357 context 596. Incomplete nail shank (L 26mm) with a square cross-section (7mm × 7mm).
2369 context 607. Incomplete nail (L 26mm).
2379 context 607. Incomplete nail shank (L 34mm).
2380 context 607. Incomplete nail (L 41mm, with an oval head 23mm × 17mm).
2381 context 607. Incomplete nail (L 28mm, with an oval head 25mm × 20mm) with a rectangular cross-section (6mm × 5mm).
2389 context 444. Incomplete and bent nail (L 28mm)
2497 context 321. Probable nail-head (D 21mm, Th 4mm), in two pieces.
2508 context 342 (6391). Possible nail-head, incomplete (22mm × 20mm).
2513 context 711 (7647). Incomplete nail (L 21mm, with an oval head 33mm × 26mm) with a shank which is rectangular in section (13mm × 11mm).

Phase 2

1801 context 600. Incomplete nail (L 25mm).
1803 context 600. Incomplete nail (L 30mm, with a circular head D 12mm).
1947 context 600 (7.00E, 114.28N, 5.98OD). Tack (L 20mm).
1948 context 600. Incomplete nail or pin-head (L 25mm).
1968 context 457. Incomplete nail (L 9mm, with a circular head D 20mm).
2041 context 473. Incomplete nail shank (L 45mm) with a rectangular cross-section (5mm × 3mm).
2070 context 354. Incomplete nail (L 15mm).
2095 context 618. Incomplete nail shank (L 18mm).
2100 context 455. Incomplete nail shank (L 31mm).
2110 context 618. Incomplete nail (L 44mm).
2243 context 573. Cluster of three bent nail shanks (Ls 35mm, 25mm and 23mm).
2281b context 354. Incomplete nail shank (L 34mm) with a rectangular cross-section (4mm × 3mm).
2281c context 354. Incomplete nail shank (L 22mm).
2281d context 354. Incomplete nail shank (L 20mm).
2294 context 582. Incomplete nail (L 14mm).
2305 context 582. Incomplete nail (L 39mm).
2307 context 582. Incomplete nail shank (L 50mm) with wood grain down one side.
2319 context 618. Incomplete nail shank (L 15mm).
2329 context 721. Incomplete nail shank (L 17mm).

Phase 3

1129 context 319. Incomplete nail shank (L 30mm).
1138 context 319. Incomplete nail shank (L 22mm).
1147 context 328. Incomplete nail shank (L 18mm).
1156 context 324. Incomplete nail shank (L 12mm).
1234 context 333. Incomplete nail shank (L 18mm).
1247 context 340. Incomplete nail shank (L 11mm).
1716 context 528. Complete nail (L 30mm, with a rectangular head 20mm × 16mm) with a square cross-section (5mm × 5mm).
1718 context 528. Incomplete nail (L 14mm) with a square cross-section (6mm × 6mm).
1719 context 528. Incomplete nail (L 15mm) with a square cross-section (3mm × 3mm). One end is adhering to a pebble.
1721 context 319. Incomplete nail (L 37mm) with a square cross-section (4mm × 4mm).
1723 context 528. Incomplete strip (L 26mm, W 7mm, Th 6mm), probably a broken nail shank.
1724 context 528. Tiny nail (L 19mm, with a formerly circular head D 6mm) with a circular cross-section (D 2mm) (Figure 15.3).
1733 context 319. Incomplete nail (L 19mm) with a square cross-section (4mm × 4mm).
1749 context 528. Incomplete strip (L 29mm, W 6mm, Th 6mm), possibly a broken nail shank.
1761 context 528. Incomplete bent nail (L 15mm, with a rectangular head 15mm × 12mm).
1766 context 335. Incomplete nail (L 28mm, with a circular head D 13mm) with a square cross-section (6mm × 6mm).
1827 context 319. Nail (L 37mm, with a circular, domed head D 16mm) with a circular cross-section (D 3mm)
1828 context 319. Nail, complete but bent (original L 47mm with an oval head 18mm × 16mm) with a square cross-section (D 3mm).
1829 context 319. Incomplete nail (L 42mm) with a square cross-section (4mm × 4mm).
1830 context 319. Incomplete nail (L 19mm).
1836 context 443. Incomplete nail (L 20mm, with a circular head D 28mm) with a circular cross-section (D 8mm).
1851 context 443. Incomplete nail (L 29mm).
1963 context 459. Incomplete nail shank (L 40mm).
1985 context 459. Incomplete nail shank (L 42mm).
1990 context 459. Incomplete nail (L 24mm).
2017 context 433. Incomplete nail shank (L 58mm) with wood grain.
2026 context 465. Incomplete nail (L 23mm).
2031 context 472. Incomplete nail (L 22mm).
2087 context 477. Incomplete nail (L 29mm).
2088 context 477. Incomplete nail shank (L 32mm).
2089 context 477. Incomplete nail (L 23mm).
2160 context 701 (7554). Incomplete nail shank (L 34mm).
2230 context 701 (7538). Incomplete nail (L 34mm, with a circular head D 18mm).
2234 context 134. Incomplete nail (L 22mm, with an oval head 18mm × 15mm).
2271 context 701 (7509). Incomplete nail shank (L 40mm) with a rectangular cross-section (7mm × 5mm).
2276 context 701 (7609). Incomplete nail shank (L 37mm).
2277 context 701 (7613). Incomplete nail shank (L 25mm) with a square cross-section (8mm × 8mm).
2287 context 701 (7507). Incomplete nail shank (L 25mm).
2302 context 459. Nail-head (18mm × 18mm).
2356 context 701 (7590). Incomplete nail shank (L 18mm).
2366b 459 (7225). Incomplete nail shank (L 13mm).
2367 and 2372 context 701 (7591). Incomplete nail shank (L 30mm) with an oval cross-section (10mm × 6mm).
2370 context 701 (7562). Incomplete nail (L 14mm).
2383 context 335. Incomplete nail-head (originally D 19mm)
2586 context 459. Incomplete nail or clench nail (L 20mm).
2634 context 701 (7598). Incomplete nail shank (L 13mm).
2636 context 701 (7563). Incomplete nail shank (L 12mm).
2643 context 701 (7508). Incomplete nail (L 10mm, with an off-centre oval head 22mm × 19mm) with a square cross-section (9mm × 9mm).

Phase 4

1124 context 317. Incomplete and bent nail shank (L 27mm).
1446 context 358. Incomplete nail shank (L 15mm).
1517 context 370. Incomplete half of a circular nail-head (D 22mm).
1529 context 366. Incomplete nail (L 43mm).
1699 context 429. Incomplete nail or bolt (L 13mm, with a square head 15mm × 15mm) and square in cross-section (7mm × 7mm).
1701 context 429. Complete nail (L 40mm, with a circular head D 17mm) and square in cross-section (5mm × 5mm).
1703 context 429. Incomplete strip (L 20mm, W 4mm, Th 4mm), probably the broken tip of a nail shank.
1706 context 429. Incomplete nail (L 15mm, with an originally circular head D 17mm) with a probably square cross-section (7 mm × 7mm).
1708 context 429. Incomplete nail-stem (L 17mm) with a rectangular cross-section (7mm × 5mm).
1728 context 430. Incomplete nail (L 34mm) with a square cross-section (4mm × 4mm).
1730 context 430. Incomplete nail (L 18mm) bent near the tip, with a square cross-section (3mm × 3mm).
1734 context 430. Incomplete strip (L 30mm, W 5mm, Th 5mm), probably a broken nail shank.
1738a context 430. Incomplete nail (L 23mm) with a probably square cross-section (4mm × 4mm).
1739 context 430. Incomplete strip (L 38mm, W 5mm, Th 5mm), probably a nail shank.
1754 context 430. Incomplete strip (L 39mm, W 6mm, Th 6mm), probably a broken nail shank.
1765 context 430. Incomplete strip (L 42mm, W 5mm, Th 5mm), probably a broken nail shank.
1931 context 224. Incomplete nail (L 43mm, with an oval head 17mm × 15mm) with a square cross-section (D 4mm).
1944 context 126 (15.12E, 102.92N, 6.05OD). Nail (L 54mm, with a diamond-shaped head 25mm × 20mm) with a square cross-section (5mm × 5mm).
1951 context 126. Incomplete nail (L 27mm).
1953a context 430. Incomplete nail (L 20mm).
1953b context 430. Incomplete nail shank (L 18mm).
1964 context 548. Incomplete nail shank (L 38mm).
1970 context 548. Incomplete nail (L 20mm, with a circular head D 24mm) with a square cross-section (5mm × 5mm).
1977 context 460. Incomplete nail shank (L 32mm).
1978 context 460. Iron strip (L 44mm, W 5mm, Th 5mm), probably a nail shank.
1982 context 440. Incomplete nail (L 38mm).
1986 context 504 (7214). Incomplete nail (L 26mm).
1989 context 552. Nail (L 66mm, with an oval head 24mm × 20mm) with a square cross-section (6mm × 6mm).
1991 context 544 (7127). Incomplete nail shank (L 62mm) with a square cross-section (5mm × 5mm).
2002 context 504 (7199). Incomplete nail (L 40mm, with a circular head D 25mm).
2010 context 504 (7269). Incomplete nail (L 35mm, with a sub-rectangular head 25mm × 23mm) with a square cross-section (6mm × 6mm).
2011 context 504 (7252). Incomplete nail (L 17mm, with a rectangular head 15mm × 12mm).
2051 context 553. Incomplete nail shank (L 34mm).
2054 context 615. Incomplete nail (L 12mm, with a circular head D 18mm).
2055 context 553. Incomplete and bent nail (L 29mm).
2061 context 553. Incomplete nail (L 16mm).
2068 context 147. Incomplete nail (L 25mm, with an off-centre oval head 19mm × 15mm).
2079 context 569. Incomplete nail (L 19mm).
2084 context 569. Incomplete bent nail (L 28mm).
2085 context 569. Incomplete nail (L 30mm).
2093 context 569. Incomplete nail (L 18mm).
2111 context 565. Incomplete and bent nail (L 40mm).
2141 and 2292 context 569. Incomplete nail shank (L 40mm) with a square cross-section (6mm × 6mm).
2254 context 548 (7099). Incomplete nail shank (L 31mm) with a square cross-section (6mm × 6mm).
2256 context 430. Incomplete nail shank (L 25mm).
2263 and 2144 context 569. Incomplete nail (L 23mm).
2267 context 504 (7199). Incomplete nail shank (L 25mm).
2314 context 574 (7463). Incomplete nail (L 30mm).
2320 context 565 (7476). Incomplete nail (L 25mm, with a circular head D 17mm) with a square cross-section (5mm × 5mm).
2330 context 556. Incomplete nail (L 12mm).
2336 context 548 (7098). Incomplete nail (L 12mm, with a circular head D 15mm).
2359 context 544 (7147). Incomplete nail shank (L 34mm) with a square cross-section (5mm × 5mm).
2368 context 548 (7092). Incomplete nail (L 33mm).
2374 context 544 (7151). Incomplete nail shank (L 30mm) with a square cross-section (5mm × 5mm).
2391 context 317. Incomplete strip (L 45mm, W 7mm, Th 5mm), rectangular in cross-section and probably a broken nail shaft.
2392 context 317. Incomplete strip (L 20mm, W 6mm, Th 6mm), square in cross-section and probably a broken nail shaft.
2394 context 317. Incomplete nail (L 15mm, with a circular head D 18mm).
2398 context 317. Incomplete and bent nail (L 15mm, with an oval head 22mm × 20mm).
2399 context 317. Incomplete nail (L 20mm, with a rectangular head 12mm × 10mm).
2401 context 317. Incomplete strip (L 39mm, W 8mm, Th 6mm), probably a nail shank.
2426 context 224. Incomplete nail (L 22mm, with a circular head D 20mm).
2490 context 144. Probable and incomplete nail (L 53mm).
2511 context 544 (7139). Possible nail-head (19mm × 15mm).
2526 context 554 (7310). Incomplete nail (L 20mm, with a circular head D 13mm) with a circular cross-section (D 4mm).
2563 context 370 (6750). Incomplete nail (L 20mm).
2603 context 317. Incomplete nail (L 27mm) with a square cross-section (7mm × 7mm).
2623 context 565 (7470). Incomplete nail shank (L 41mm) with wood grain.
2624 context 565 (7470). Incomplete nail (L 25mm, with a circular head D 12mm).
2625 context 565 (7470). Incomplete nail (L 30mm, with a circular head D 19mm).
2626 context 565 (7470). Incomplete nail (L 20mm).
2652 context 504 (7198). Incomplete nail shank (L 26mm).
2655 context 555 (7348). Incomplete nail shank (L 19mm).
2656 context 555 (7359). Incomplete nail shank (L 18mm).
2658 context 555 (7371). Incomplete nail shank (L 24mm).
2660 context 565 (7476). Incomplete nail shank (L 30mm).
2661 context 565 (7540). Incomplete nail shank (L 27mm).
2668 context 440. Incomplete nail (L 23mm, with a circular head D 21mm).
2784 context 544 (7144). Incomplete nail (L 13mm, with an

oval head 20mm × 15mm) with a rectangular cross-section (6mm × 3mm).

Phase 5

1012 context 023 (14.00E, 112.20N). Incomplete nail (L 36mm, D 4mm).
1018 context 023 (16.40E, 114.25N). Nail (L 71mm, with a circular head D 25mm) with a rectangular cross-section (6mm × 5mm).
1039 context 010. Incomplete nail shank (L 31mm).
1065 context 308. Incomplete nail (L 36mm) with a rectangular cross-section (6mm × 5mm).
1069 context 308. Incomplete nail shank (L 20mm).
1071 context 308. Incomplete nail shank (L 58mm) with a square cross-section (5mm × 5mm).
1078 context 308. Incomplete nail (L 34mm).
1101 context 308. Incomplete nail shank (L 21mm).
1412 context 351 (9.45E, 115.30N, 6.45OD). Near-complete nail (L 61mm, with a circular head D 20mm) missing its tip, with a rectangular cross-section (Figure 15.4).
1415 context 351 (7.50E, 116.47N, 6.33OD). Incomplete nail shank or rectangular-sectioned strip (L 23mm, W 6mm, Th 7mm).
1491 context 010 (14.33E, 111.37N, 6.78OD). Incomplete nail (L 42mm) with a square cross-section (5mm × 5mm).
1492 context 010 (14.66E, 111.65N, 6.75OD). Incomplete nail (L 26mm, with a circular head D 27mm) with a square cross-section (4mm × 4mm). There is a wood grain imprint on the top of the nail-head.
1497 context 010 (14.96E, 111.85N, 6.61OD). Incomplete nail (L 45mm, with a circular head D 26mm) with a probably square cross-section (7mm × 7mm).
1499 context 351. Incomplete nail (L 35mm, with a possibly rectangular head 20mm × 12mm) with a square cross-section (4mm × 4mm).
1505a context 010. Incomplete nail (L 21mm).
1505b context 010. Incomplete nail (L 25mm) with a square cross-section (3mm × 3mm).
1526 context 219. Incomplete nail (L 34mm) with a square cross-section (4mm × 4mm).
1532 context 219 (11.70E, 102.63N, 6.55OD). Nail (L 43mm, with an off-centre circular head D 21mm).
1541 context 219. Small incomplete strip (L 12mm, W 5mm, Th 5mm), probably a nail shank.
1542 context 219. Incomplete nail (L 24mm, with an oval head 21mm × 19mm) with a rectangular cross-section.
1546a context 114. Oval nail-head (19mm × 16mm). It probably conjoins with clench nail SF 1546b (Figure 15.4).
1548 context 386. Incomplete strip (L 29mm, W 5mm, Th 5mm), probably a nail shank.
1554 context 386. Incomplete nail (L 31mm) with a square cross-section (4mm–1.5mm × 4mm–1.5mm).
1556a context 386. Incomplete nail (L 32mm, with a circular head D 21mm).
1556b context 386. Incomplete strip (L 16mm, W 4mm, Th 4mm), probably a nail shank.
1564 context 117. Incomplete strip (L 14mm, W 5mm, Th 5mm), probably a nail shank.
1598 context 397. Incomplete square-sectioned shank (L 13mm, W 7mm, Th 7mm) with a rounded end. From microscopic examination there is an imprint of wood on the stem.
1601 context 118. Incomplete strip (L 16mm, W 5mm, Th 5mm), probably a nail shank.
1617 context 010 (12.88E, 111.75N, 6.52OD). Broken nail-head (18mm × 17mm).
1623 context 010. Incomplete nail (L 15mm, with a circular head D 15mm) with a square cross-section (4mm × 4mm).
1629 context 308. Incomplete bent nail shank (L 24mm) with a rectangular section (5mm × 4mm).
1635 context 308. Incomplete nail (L 17mm, with a circular head D 19mm).
1642 context 308. Incomplete strip (L 16mm, W 6mm, Th 4mm), probably a nail shank.
1647 context 308. Possibly a half of a nail-head (originally D 20mm)
1650 context 503 (6961). Incomplete strip (L 19mm, W 4mm, Th 3mm), probably a nail shank.
1660 context 308. Incomplete nail (L 47mm) with a square cross-section (5mm × 5mm).
1667 context 416. Incomplete strip (L 40mm, W 7mm, Th 4mm), possibly a nail shank.
1684a context 308. Incomplete nail with a bent shank (L 11mm) and a circular head (D 15mm).
1685 context 308. Incomplete strip (L 26mm, W 3mm, Th 4mm), probably a broken nail shank.
1689 context 507. Incomplete nail (L 28mm, with an originally circular head D 18mm) and probably rectangular in cross-section.
1690 context 507. Incomplete strip (L 24mm, W 4mm, Th 4mm), probably a broken nail shank.
1711 context 313. Incomplete nail (L 15mm, with an oval domed head 15mm × 13mm) with a square cross-section (4mm × 4mm). It has been partially sawn through at its base and its end is sawn off.
1712 context 313. Incomplete nail (L 13mm, with an oval head 12mm × 10mm) with a square cross-section (4mm × 4mm).
1713 context 313. Incomplete nail (L 17mm) with a square cross-section (5mm × 5mm).
1714 context 313. Incomplete nail (L 29mm, with a circular head D 16mm) with a square cross-section (6mm × 6mm).
1776 context 533. Incomplete nail (L 15mm).
1778 context 533. Incomplete nail (L 18mm, with a circular head D 20mm).
1783 context 533. Probable incomplete nail (L 19mm) with a square cross-section (5mm × 5mm).
1823 context 397. Oval nail-head (28mm × 23mm) with an incomplete rectangular shank (L 16mm).
1901 context 010. Incomplete nail (L 34mm).
1905 context 547 (8.77E, 111.16N, 6.17OD). Incomplete nail shank (L 29mm).
1906 context 534. Incomplete nail shank (L 29mm).
1907 context 533. Incomplete nail (L 15mm).
1908 context 534. Incomplete nail (L 38mm).
1909 context 533. Incomplete nail-head (D 15mm).
1911 context 533. Incomplete nail shaft (L 31mm).
1913 context 533. Incomplete bent nail shank (L 28mm).
1914 context 533. Incomplete nail shank (L 20mm).
1917 context 547. Incomplete nail (L 37mm, with a circular head D 19mm) with a square cross-section (4mm × 4mm).
1919 context 534. Incomplete tapering shank (L 43mm, W 11mm–6mm, Th 8mm) with a turned-in tip and rectangular in section.
1927 context 533. Incomplete nail or clench nail (L 21mm).
1929 context 547. Incomplete nail shank (L 15mm).
1935 a context 533. Tack (L 15mm, with an oval head 14mm × 11mm) with a rectangular cross-section.
1935b context 533. Incomplete nail (L 26mm).

1943 context 420. Incomplete nail (L 33mm, with a circular head D 18mm).
2239 context 534. Incomplete nail shank (L 27mm).
2265 context 125. Nail (L 54mm, with a circular head D 25mm) and a square cross-section (6mm × 6mm).
2386a context 118. Incomplete and bent nail (L 23mm, with an oval head 22mm × 18mm) with a rectangular cross-section.
2386b context 118. Incomplete nail shank (L 33mm, W 5mm, Th 5mm) square in cross-section.
2390 context 114. Incomplete nail (L 15mm, with a rounded square head 30mm × 30mm) with a circular-sectioned shank (D 11mm).
2402 context 308. Incomplete strip (L 29mm, W 3mm, Th 3mm), probably a nail shank.
2407 context 315. Incomplete strip (L 32mm, W 5mm, Th 4mm), probably a nail shank.
2409 context 315. Incomplete strip (L 13mm, W 9mm, Th 8mm), probably a nail shank.
2410 context 315. Incomplete and bent nail shank (L 29mm).
2415 context 315. Incomplete and bent strip (L 29mm, W 6mm, Th 6mm), probably a nail shank.
2416 context 315. Broken and bent nail (L 16mm, with a circular head D 20mm).
2424 context 308. Incomplete and bent nail (L 25mm, with a circular head D 17mm) with a circular cross-section (D 4mm).
2425 context 308. Incomplete strip (L 20mm, W 5mm, Th 5mm), probably a nail shank.
2429 context 395. Incomplete nail (L 7mm, with a rectangular head 18mm × 15mm).
2461 context 308. Small bent-over stem or bar (L 23mm, W 5mm, Th 5mm), probably a nail shank.
2470 context 313. Bent strip (L 30mm, W 4mm, Th 3mm), probably a bent nail-stem.
2554 context 010. Incomplete nail (L 9mm, with a circular head D 19mm).
2559 context 533. Small piece of plate (L 18mm, W 14mm, Th 2mm), probably a nail-head.
2565 context 351. Incomplete nail (L 14mm).
2566 context 351. Incomplete strip (L 20mm, W 5mm, Th 5mm), probably a broken nail shank.
2601 context 315. Incomplete nail (L 14mm).
2606 context 010. Nail (L 68mm).
2610 context 010. Incomplete nail shank (L 35mm).
2611 context 010. Incomplete nail (L 9mm) with a square cross-section (5mm × 5mm).
2616 context 010. Incomplete nail shank (L 41mm).
2669 context 503. Incomplete nail shank (L 26mm).
2670 context 505. Incomplete nail (L 26mm).
2765 context 010. Incomplete nail (L 25mm).
2803 context 308. Incomplete nail shank (L 21mm).

Phase 6

1419 context 350 (8.45E, 112.12N, 6.38OD). Incomplete nail (L 22mm, with an oval head 26mm × 23mm) with a rectangular cross-section.
1433b context 357 (9.33E, 108.82N, 6.84OD). Incomplete nail (L 25mm, D 5mm).
1500 context 367. Incomplete nail (L 32mm) with a square cross-section (5mm × 5mm).
1510 context 381 (8.20E, 107.00N, 6.17OD). Incomplete nail (L 40mm, with an off-centre oval head 16mm × 13mm) with a rectangular cross-section (Figure 15.4).
1511 context 367. Incomplete nail (L 16mm).
1513 context 367. Incomplete nail (L 11mm, with a circular head D 17mm).
1545 context 369. Incomplete nail (L 34mm) with wood grain imprints on its shaft. There is a small plate (L 12mm, W 12mm, Th 3mm) adhering to the nail.
1574 context 367. Incomplete strip (L 26mm, W 4mm, Th 4mm), probably a nail shank.
1592 context 341. Incomplete nail (L 32mm, with a circular head D 14mm) with a square cross-section (3mm × 3mm).
1662 context 404. Incomplete nail (L 36mm) with a rectangular cross-section (5mm × 4mm).
2431 context 394 (6939). Incomplete nail (L 36mm, with a circular head D 16mm) with a square cross-section.
2492 context 350 (6544). Nail with a rounded head (D 18mm) and an incomplete, probably square-sectioned shank (L 20mm), with an additional round (D 16mm) concretion on top of the head.
2524 context 367. Incomplete possible nail (L 35mm) with a possibly rectangular head (15mm × 13mm) and a shank rectangular in section (11mm × 6mm).
2544 context 367. Incomplete nail (L 42mm, with an indeterminate head 17mm across) with an indeterminate cross-section.
2555 context 367. Incomplete nail shank (L 32mm) with a rectangular cross-section.

Phase 7

1027 context 046. Incomplete nail (L 30mm) with a square cross-section (4mm × 4mm).
1028 context 046. Incomplete nail shank (L 44mm) with a square cross-section (5mm × 5mm).
1034 context 046. Incomplete nail shank (L 34mm).
1062 context 303 (10.70E, 103.20N). Incomplete nail shank (L 31mm).
1072 context 303. Incomplete nail (L 29mm).
1094 context 311 (8.50E, 106.50N). Incomplete tip of a nail (L 33mm) with a rectangular section.
1098a context 311. Incomplete nail (L 18mm, with a slightly domed, oval head 25mm × 21mm).
1098b context 311. Incomplete nail (L 27mm, with a circular head D 24mm).
1128 context 201. Incomplete nail shank (L 12mm).
1130 context 201. Incomplete nail shank (L 16mm).
1153 context 322. Incomplete nail shank (L 14mm).
1172 context 330. Incomplete nail (L 15mm).
1175 context 330. Incomplete nail shank (L 24mm).
1177 context 327. Incomplete nail (L 35mm, with a circular head D 23mm).
1184 context 330 (10.12E, 109.70N, 6.76OD). Incomplete bent nail (L 35mm).
1188 context 330 (10.75E, 110.73N, 6.83OD). Incomplete nail (L 13mm) with a square cross-section (5mm × 5mm).
1189 context 330. Nail (L 70mm, with a circular head D 24mm).
1190 context 330 (10.15E, 110.40N, 6.77OD). Incomplete nail shank (L 47mm) with a square cross-section (5mm × 5mm).
1204 context 303. Incomplete nail shank (L 30mm).
1222 context 311. Incomplete nail shank (L 29mm).
1229 context 060. Incomplete nail shank (L 23mm).
1231 context 311. Incomplete nail-head (D 20mm).
1237 context 311. Incomplete nail (L 18mm, with a circular head D 21mm) with a square cross-section (5mm × 5mm).
1248 context 200 (11.40E, 106.40N, 6.21OD). Incomplete nail shank (L 64mm).

1448 context 205 (6670; 9.41E, 104.52N, 5.91OD). Incomplete nail shank or square-sectioned strip (L 29mm, W 5mm, Th 5mm).
1455 context 214 (6689; 8.61E, 102.40N, 6.02OD). Incomplete nail shank (L 24mm) with a square cross-section (5mm × 5mm).
1471 context 009 (14.50E, 111.70N, 6.40OD). Incomplete tapered strip (L 38mm, W 8mm–3mm, Th 6mm), possibly a nail shank.
1496 context 206 (6817; 12.21E, 104.49N, 6.11OD). Incomplete nail (L 33mm).
1551 context 205. Incomplete tapered strip (L 17mm, W 4mm–1mm, Th 4mm–1mm), probably the tip of a nail.
1562 context 388. Incomplete nail (58mm) with a square cross-section (5mm–3mm × 5mm–3mm).
1569 context 206 (6603). Incomplete nail (L 32mm) with a square cross-section (5mm × 5mm).
1581 context 322. Incomplete strip (L 34mm, W 4mm, Th 4mm), probably a nail shank.
1753 context 209. Incomplete nail (L 48mm) with a square cross-section (5mm × 5mm).
1791 context 204 (6565). Incomplete nail (L 35mm) with a square cross-section (5mm × 5mm).
1795 context 205 (6755). Incomplete nail (L 22mm, with an oval, domed head 22mm × 18mm) with a square cross-section (2mm × 2mm).
2251 context 205 (6864). Incomplete nail shank (L 22mm) with a square cross-section (6mm × 6mm).
2252 context 205 (6685). Incomplete nail (L 19mm).
2433 context 209. Incomplete nail shank (L 23mm) with wood grain on one side.
2434 context 209. Incomplete nail shank (L 27mm).
2441 context 009. Nail-head (D 20mm).
2442 context 009. Incomplete strip (L 25mm, W 4mm, Th 4mm) bent at one end, probably a nail shank.
2560 context 204 (6793). Incomplete nail (L 11mm).
2564 context 205 (6719). Incomplete nail (L 28mm) with wood grain.
2618 context 300. Incomplete nail shank (L 28mm).
2619 context 300. Incomplete nail shank (L 24mm).
2664 context 205 (6830). Incomplete nail shank (L 24mm).
2781 context 204 (6503). Incomplete nail-head (L 15mm, with an oval head 18mm × 13mm).

Phase 8

1005 context 003. Incomplete nail- or rivet-head (L 8mm).
1041 context 052 (9.37E, 100.57N, 6.45OD). Incomplete nail (L 44mm, with a head which is possibly square).
1076 context 054 (11.80E, 115.00N, 6.64OD). Incomplete nail (L 17mm).
1144 context 091 (13.40E, 109.20N, 5.82OD). Incomplete nail (L 30mm, with a slightly domed, off-centre, oval head 24mm × 20mm).
1159 context 065 (13.35E, 106.88N, 5.78OD). Incomplete nail shank (L 57mm)
1261b context 034. Incomplete nail (L 42mm).
1262 context 034. Incomplete nail (L 27mm) with another incomplete nail shank (L 22mm) corroded to its side.
1263 context 034. Incomplete nail (L 30mm, with a slightly domed, oval head 27mm × 21mm).
1264 context 034. Incomplete nail (L 36mm).
1265 context 034. Incomplete nail shank (L 23mm).
1438a context 355. Incomplete nail (L 27mm) with a square cross-section (4mm × 4mm).
1479 context 108 (15.15E, 108.50N, 6.53OD). Near-complete nail (L 51mm, with a circular head D 22mm), missing its tip, with a rectangular cross-section. It was found placed symmetrically along the axis of a scallop shell with its tip to the shell's hinge (Figure 15.4).
2581 context 003. Bent nail shank (L 21mm) with a square cross-section (5mm × 5mm).
2609 context 034. Incomplete nail (L 23mm).
2802 context 058. Incomplete nail shank (L 34mm).

Phase 9

1022 context 028 (13.85E, 103.55N). Incomplete nail (L 47mm) with a square cross-section (4mm × 4mm).
1038 context 053. Incomplete nail shank (L 13mm).
1046 context 061. Incomplete nail (L 27mm, with an off-centre square head 18mm × 18mm).
2613 context 044. Incomplete nail (L 19mm).

Unstratified

1252 context 001. Incomplete nail shank (L 28mm).
2588 context 001. Incomplete nail (L 13mm, with a circular head D 23mm) with a square cross-section (5mm × 5mm).
2589 context 001. Incomplete bent nail (L 16mm, with a circular head D 18mm) and a rectangular cross-section (6mm × 4mm).
2591 context 001. Incomplete nail shank (L 56mm).
2592 context 001. Incomplete nail shank (L 34mm).
2593 context 001. Incomplete nail (L 23mm, with a circular head D 20mm).

15.13 Strips and bars

Strips and bars are defined as having a maximum width to a maximum thickness ratio of less than 4:1 and a relatively constant cross-section size and form (Ottaway 1992: 493). Bars are markedly wider and thicker. The strips and bars from Cille Pheadair are virtually all broken and are probably discarded scrap rather than blanks or offcuts produced in the ironworking process. Some of the smaller strips in the assemblage may be broken-off nail shanks, and some or all of the tapered strip fragments could be tangs.

The 38 strips and three bars from Cille Pheadair are mostly fragmentary and small. There are:

- fragments of two strips from phase 1,
- two strips and a bar from phase 2,
- two strips (one complete) from phase 3,
- ten strips (one complete) from phase 4,
- 14 strips (two complete) and a complete bar from phase 5,
- two strips and a bar from phase 6,
- two strips from phase 7,
- three strips from phase 8,
- a twisted strip from phase 9.

Most of the strips have parallel sides but a couple are tapered and may be the broken-off tangs of knives or other artefacts (see above). One other (SF 1020 from 004 in phase 8) may be part of a small knife. One item is sickle-shaped (SF 1702 in 429 from phase 4), one is twisted (SF 1108 in 086 from phase 9) and five are curved (SF 1077 in 308, SF 1105 in 313 and SF 1915 in 533 from phase 5, SF 1252 in 203 from phase 7, and probably SF 2517 in 701 from phase 3).

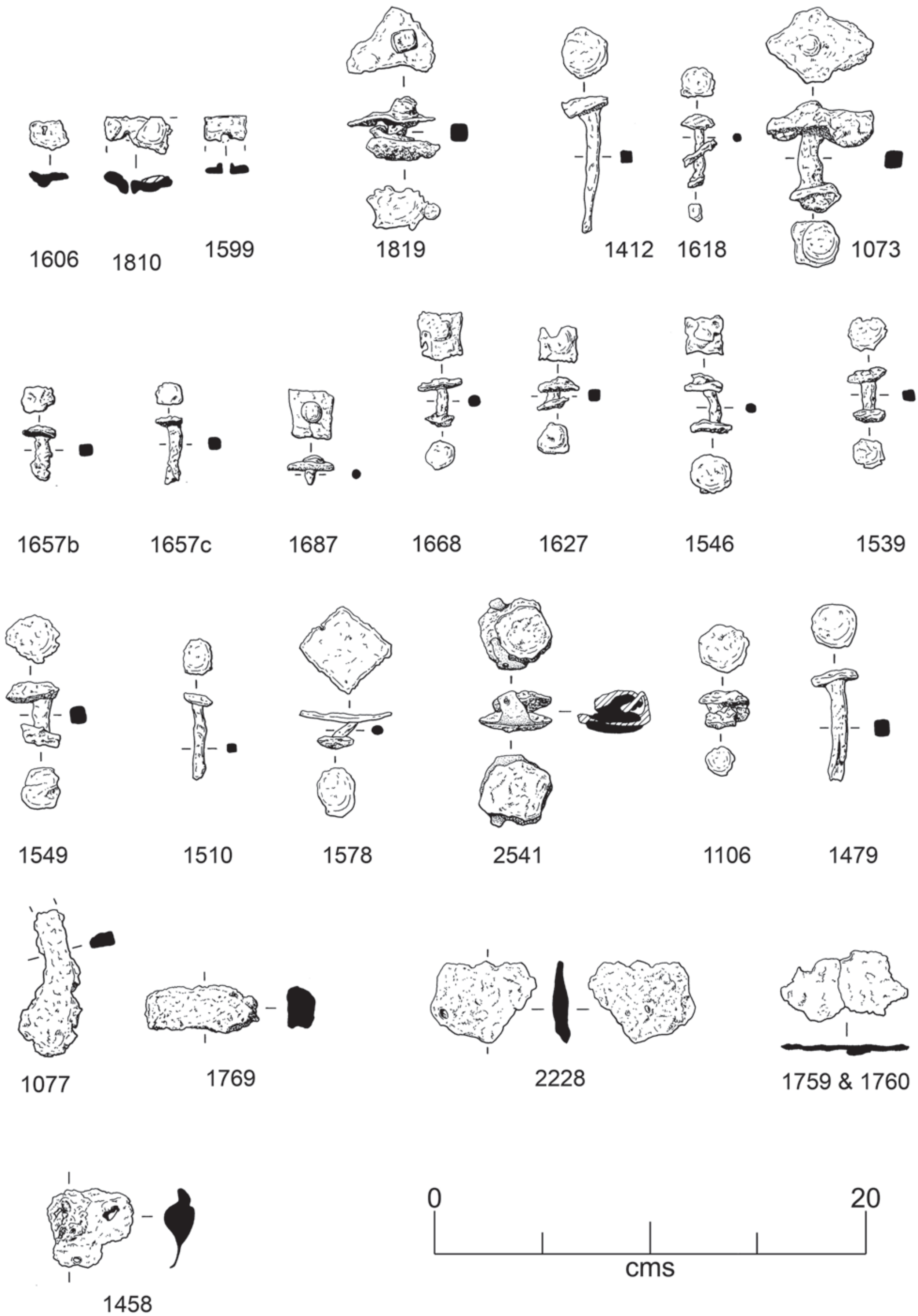

Figure 15.4. Iron nails and other items

Strips vary in width between 5mm and 25mm and in thickness between 1.5mm and 10mm. All but five items have a thickness between 2mm and 6mm and all but seven are no wider than 13mm. None of the strips are longer than 73mm and most are under 40mm long. The lengths of the complete strips are: 25mm, 26mm, 33mm, 36mm and 73mm. The three bars have widths between 17mm and 23mm and thicknesses between 10mm and 20mm. The complete bar is 49mm long; the two broken ones are 24mm and 84mm long.

Phase 1

1163 context 323. Incomplete bent strip (L 51mm, W 8mm, Th 4mm).

1842 context 608. Incomplete strip (L 44mm, W 6mm, Th 6mm), possibly a broken nail shank.

Phase 2

1805 context 600. Incomplete strip (L 20mm, W 10mm, Th 8mm).

2121 context 620. Incomplete strip (L 37mm, W 6mm, Th 3mm).

2346 context 579. Incomplete bar fragment (L 24mm, W 23mm, Th 15mm).

Phase 3

1764 context 335. Incomplete strip (L 28mm, W 7mm, Th 5mm), possibly a broken nail shank.

2382 context 335. Incomplete strip (L 22mm, W 7mm, Th 2mm).

2517 context 701 (7566). Strip, probably curved (L 33mm, W 11mm, Th 6mm).

Phase 4

1702 context 429. Small incomplete sickle-shaped strip (L 25mm, W 5mm, Th 2mm).

*1738b context 43*0. Incomplete strip (L 32mm, W 9mm, Th 4mm).

1762 context 430. Incomplete strip (L 29mm, W 5mm, Th 5mm), possibly a broken nail shank.

1800 context 435. Probable strip (L 26mm, W 18mm, Th 6mm).

1813 context 440. Flat strip (L 25mm, W 9mm, Th 2mm) accreted onto a lump (L 12mm, W 4mm, Th 5mm).

2067 context 147. Incomplete tapered strip (L 67mm, W 15mm–13mm, Th 5mm) with a rectangular cross-section.

2077 context 569. Strip (L 56mm, W 6mm, Th 4mm) which is possibly a nail shank.

2400 context 317. Incomplete tapered strip (L 18mm, W 12mm–6mm, Th 5mm).

2557 context 133. Incomplete strip (L 23mm, W 7mm, Th 5mm), possibly a nail shank.

Phase 5

1077 context 308 (15.05E, 113.49N, 6.33OD). Incomplete curved and tapered strip (L 66mm, W 15mm–10mm, Th 4mm), possibly a broken tang of a large knife or tool (Figure 15.4).

1105 context 313 (11.70E, 113.30N, 6.45OD). Curved strip (L 73mm, W 8mm, Th 5mm); the diameter of the curvature is *c*.400mm. It may possibly be a nail shank.

1659 context 308. Incomplete strip (L 31mm, W 13mm, Th 2mm).

1665 context 010. Small strip (L 26mm, W 12mm, Th 4mm).

1682 context 308. Incomplete strip (L 33mm, W 7mm, Th 5mm), possibly a broken nail shank.

1683 context 308. Incomplete and bent strip (L 28mm, W 5mm, Th 4mm), possibly a broken nail shank.

1769 context 397. Rectangular bar (L 49mm, W 17mm, Th 10mm) (Figure 15.4).

1771 context 313. Small flat strip (L 17mm, W 16mm, Th 4mm).

1780 context 533. Incomplete strip (L 20mm, W 7mm, Th 7mm).

1784 context 533. Incomplete strip (L 39mm, W 25mm, Th 5mm).

1915 context 533. Incomplete curved strip (L 21mm, W 10mm, Th 5mm).

2233 context 547. Incomplete strip (L 22mm, W 17mm, Th 1.5mm).

2408 context 315. Incomplete strip (L 26mm, W 9mm, Th 2mm).

2467 context 313. Incomplete strip (L 20mm, W 6mm, Th 2mm).

2469 context 313. Strip (L 28mm, W 4mm, Th 4mm), possibly a nail-stem.

Phase 6

1589 context 341. Incomplete strip (L 38mm, W 4mm, Th 4mm, probably a nail shank.

2523 context 367. Incomplete small bar or large shank (L 84mm, W 20mm, Th 20mm).

2543 context 367. Rectangular-sectioned bar (L 31mm, W 6mm, Th 6mm).

Phase 7

1735 context 209. Small incomplete strip (L 12mm, W 5mm, Th 1.5mm).

2264 context 205 (6718). Two fragments of a slightly bent strip (L *c*.32mm, W 13mm, Th 3mm).

Phase 8

1020 context 004 (10.00E, 99.60N). Strip (L 35mm, W 6mm–4mm, Th 4mm) tapered towards one end. This is possibly a very small knife blade of back form D.

1230 context 091. Incomplete tapered strip (L 45mm, W 6mm–3mm, Th 2mm), possibly a tang.

2782 context 065 (6131). Incomplete strip (L 22mm, W 9mm, Th 3mm).

Phase 9

1108 context 086. Incomplete twisted strip (L 24mm, W 9mm, Th 2mm).

15.14 Plates

Plates are defined as having a maximum width to a maximum thickness ratio of more than 4:1 and usually a maximum thickness of 6mm or less (Ottaway 1992: 501). Like the strips from the site, the plate fragments from Cille Pheadair are probably all discarded scrap from broken artefacts rather than unused products or by-products of ironworking. A certain number of the smaller fragments may be broken roves or nail-heads.

There are 50 plate fragments from Cille Pheadair. All are flat and two of them have been bent; curved pieces are classed as cauldron or bowl fragments (see section 15.9 above). They range in thickness from 0.5mm to 6mm, with most between 1.5mm and 2mm and only two over 4mm thick. There is possibly a trend towards thicker plate through time, from mostly 1.5mm–2mm in phases 2–5 to 3mm–4mm in phases 6–7 but this is based on a very small sample.

There are:

- three plate fragments from phase 2,
- 11 from phase 3 (mostly from floor layer 701),
- 15 from phase 4,
- 15 from phase 5,
- two from phase 6,
- three from phase 7,
- one from phase 8.

The only plates that appear to be complete are a sub-rectangular piece from phase 5 (SF 1070 in 308) and a rectangular piece like a rove but with no hole (SF 2411 and SF 2412 in 315 from phase 5). Their dimensions are 38mm × 25mm and 22mm × 18mm respectively. The largest piece is SF 1720 (in 528 from phase 3) which is part of a rectangular plate originally 54mm across. The other very large piece (SF 2421 in 394 from phase 6) is 50mm across and was originally triangular. One plate fragment (SF 2228 in 548 from phase 4) has mineralized wood grain on one side and a carbonized barley grain adhering to the other.

Phase 2

1961 context 456 (12.70 E, 107.40N, 5.81OD). Plate fragment (L 45mm, W 33mm, Th 2mm).

2250 context 354. Plate fragment (L 28mm, W 23mm, Th 3mm).

2343 context 579. Plate fragment (L 35mm, W 22mm, Th 1.5mm).

Phase 3

1132 context 319. Plate fragment (L 26mm, W 24mm, Th 2mm–5mm).

1720 context 528. Fragment of rectangular plate (L 54mm, W 18mm, Th 0.5mm).

2298 context 459. Three fragments of plate, possibly an incomplete and broken rove.

2632 context 701 (7604). Plate fragment (L 18mm, W 14mm, Th 1.5mm).

2633 context 701 (7596). Plate fragment (L 20mm, W 14mm, Th 1.5mm).

2635 context 701 (7566). Plate fragment (L 17mm, W 14mm, Th 1.5mm).

2638 context 701 (7565). Plate fragment (L 19mm, W 15mm, Th 2mm).

2639 context 701 (7617). Plate fragment (L 32mm, W 12mm, Th 4mm).

2644 context 701 (7597). Two fragments of plate (L 28mm, W 15mm, Th 2mm and L 18mm, W 15mm, Th 2mm).

2645 context 701 (7611). Plate fragment (L 15mm, W 13mm, Th 1.5mm).

2646 context 701 (7612). Plate fragment (L 20mm, W 14mm, Th 5mm).

Phase 4

1441 context 356. Small fragment of plate (L 26mm, W 13mm, Th 1mm).

1759 and 1760 context 430. Plate fragment (L 58mm, W 29mm, Th 1.5mm) broken in two (Figure 15.4).

1799 context 435. Plate fragment (L 14mm, W 12mm, Th 2mm), possibly from a nail-head or rove.

1811 context 440. Small plate fragment (L 21mm, W 11mm, Th 2mm).

1938 context 126. Plate fragment (L 38mm, W 22mm, Th 4mm) with one end bent over.

1939 context 126. Plate fragments (L 22mm, W 10mm, Th 2mm).

2143 context 569. Plate fragment (L 35mm, W 25mm, Th 3mm) broken into three pieces.

2227 context 569. Two fragments of plate (L 17mm, W 11mm, Th 2mm and L 11mm, W 9mm, Th 2mm), possibly a broken nail-head.

2228 context 548 (7088). Plate fragment (L 48mm, W 40mm, Th 1mm) with wood grain at one end of one side and a carbonized barley grain adhering to the other (Figure 15.4).

2245a context 544 (7127). Plate fragment (L 30mm, W 21mm, Th 1.5mm).

2245b context 544 (7127). Plate fragment (L 25mm, W 19mm, Th 1.5mm).
2261, 2262, 2140 and 2146 context 569. Plate fragment (originally *c*. L 30mm, W 20mm, Th 4mm), broken into five pieces.
2427 context 224. Two incomplete plates sandwiched together (L 38mm, W 20mm, Th 1mm and L 31mm, W 24mm, Th 2mm).
2662 context 565 (7477). Plate fragment (L 26mm, W 13mm, Th 2mm), possibly a broken rove.
2677 context 430. Plate fragment (L 14mm, W 12mm, Th 6mm).

Phase 5
1070 context 308 (13.94E, 115.39N, 6.26OD). Complete sub-rectangular plate (L 38mm, W 25mm, Th 3mm).
1099 context 308 (13.90E, 114.30N, 6.31OD). Plate fragment (L 23mm, W 15mm, Th 2mm).
1458 context 010 (15.00E, 111.55N, 1.51OD). Fragment of rectangular plate (L 38mm, W 37mm, Th 1mm–2mm) (Figure 15.4).
1505c context 010. Plate fragment (L 17mm, W 14mm, Th 4mm).
1561 context 219. Plate fragment (L 16mm, W 11mm, Th 3mm), possibly a broken rove.
1611 context 118. Small fragment of plate (L 21mm, W 20mm, Th 1mm).
1619 context 010 (14.12E, 112.02N, 6.39OD). Small fragment of plate (L 18mm, W 16mm, Th 1mm).
1779 context 533. Plate fragment (L 20mm, W 15mm, Th 2mm), possibly a broken rove.
1934 context 533. Plate fragment (L 43mm, W 30mm, Th 4mm).
1936 context 533 Plate fragment (L 30mm, W 15mm, Th 1.5mm).
2411 and 2412 context 315. Complete plate (L 22mm, W 18mm) but not a rove because it has no hole.
2413 context 315. Plate fragment (L 17mm, W 15mm, Th 2mm), possibly a broken nail-head or rove.
2546 context 313. Bent fragment of plate (L 22mm, W 17mm, Th 5mm).
2553 context 308. Small fragment of plate (L 15mm, W 12mm, Th 2mm), possibly a nail-head.
2608 context 010. Plate in two pieces (L 21mm, W 19mm, Th 2mm).

Phase 6
2421 context 394. Incomplete triangular plate (L 50mm, W 26mm, Th 4mm) with an oval lump (26mm × 22mm) adhering to one side.
2542 context 367. Bent plate fragment (L 38mm, W 20mm, Th 3mm).

Phase 7
1751 context 209. Plate fragment (L 27mm, W 18mm, Th 3mm).
2439 context 204 (6568). Plate fragment (L 18mm, W 13mm, Th 2mm), probably a nail-head.
2440 context 204 (6568). Fragment of a plate, strip or bar (L 10mm, W 9mm, Th 8mm).

Phase 8
1032 context 013. Plate fragment (L 35mm, W 26mm, Th 2mm).

15.15 Unidentifiable iron fragments

Listed here are 78 pieces of iron which are too small or too formless to be identifiable. A further two unidentified iron artefacts are listed in Chapter 13.16 with the iron ornaments. Most of these unidentifiable fragments come from phases 3, 4 and 5. Interestingly, those in phase 3 form a higher than average proportion of the total assemblage for that phase.

Phase 1
1152 context 323. Unidentified lump (L 20mm, W 12mm, Th 8mm).
1154 context 323 (12.00E, 113.30N, 6.42OD). Solid and heavy unidentified lump (L 23mm, W 21mm, Th 10mm).
1160 context 323. Unidentified lump (L 15mm, W 12mm, Th 8mm).
1161 context 323. Unidentified lump (L 16mm, W 12mm, Th 7mm).
1821 context 323. Unidentified lump (L 21mm, W 14mm, Th 5mm).
2520 context 713 (7657). Unidentified fragment (L 35mm, W 12mm, Th 10mm) and two smaller fragments.
2627 context 596. Unidentified lump (L 27mm, W 22mm, Th 9mm), possibly a rove.
2628 context 596. Unidentified lump (L 22mm, W 18mm, Th 11mm), possibly a rove.

Phase 2
1212 context 332. Unidentified lump (L 31mm, W 23mm, Th 16mm).
1216 context 332. Unidentified lump (L 18mm, W 11mm, Th 9mm).
1217 context 332. Unidentified fragment (L 23mm, W 23mm, Th 13mm).
1219 context 332. Unidentified lump (L 19mm, W 15mm, Th 11mm).
1255 context 339. Unidentified lump (L 16mm, W 12mm, Th 9mm).
2273 context 600. Pellet-shaped lump of two fragments (L 24mm, W 17mm, Th 8mm and Th 6mm) sandwiched together.
2516 context 582 (7497). Unidentified lump (L 18mm, W 16mm, Th 10mm).

Phase 3
1235 context 333. Unidentified fragment (L 21mm, W 18mm, Th 5mm).
1241 context 340. Unidentified fragment (L 17mm, W 15mm, Th 6mm).
1260 context 340. Unidentified lump (L 16mm, W 13mm, Th 10mm).
1744 context 319. Unidentified lump (L 13mm, W 10mm, Th 6mm).
1747 context 528. Unidentified lump (L 18mm, W 10mm, Th 7mm).
2019 context 443. Unidentified fragment (L 14mm, W 11mm, Th 8mm).
2022 context 462. Unidentified lump (L 27mm, W 21mm, Th 18mm).
2024 context 462. Unidentified lump (L 14mm, W 10mm, Th 7mm).
2232c context 454. Unidentified fragment (L 10mm, W 5mm, Th 5mm).
2510 context 328 (6294). Unidentified fragment (L 20mm, W 14mm, Th 4mm).
2512 context 701 (7612). Two probably conjoining fragments of a lump (L 35mm, W 48mm, Th 17mm).

2518 context 701 (7600). Unidentified lump (L 29mm, W 11mm, Th 10mm).
2519 context 701 (7600). Unidentified fragment (L 23mm, W 18mm, Th 7mm).
2637 context 701 (7510). Unidentified lump (L 14mm, W 13mm, Th 7mm).
2640 context 701 (7536). Unidentified lump (L 21mm, W 13mm, Th 9mm).

Phase 4

1436 context 356. Unidentified lump (L 17mm, W 12mm, Th 5mm).
1698 context 317. Large oval concretion (L 45mm, W 37mm, Th 23mm).
1756 context 430. Unidentified fragment (L 12mm, W 5mm, Th 5mm).
1804 context 440. Triangular lump (L 28mm, W 21mm, Th 11mm).
1835 context 442. Unidentified lump (L 16mm, W 9mm, Th 8mm).
2060 context 553. Unidentified lump (L 17mm, W 13mm, Th 7mm).
2393 context 317. Unidentified lump (L 12mm, W 10mm, Th 7mm).
2654 context 555 (7381). Unidentified lump (L 18mm, W 12mm, Th 8mm).
2657 context 555 (7358). Unidentified lump (L 20mm, W 15mm, Th 10mm).
2760 context 370 (6727). Unidentified lump (L 14mm, W 10mm, Th 7mm).
2783 context 544 (7123). Unidentified lump in two pieces (L 43mm, W 22mm, Th 3mm).
2785 context 544 (7146). Unidentified lump (L 23mm, W 11mm, Th 3mm).
2786 context 548 (7088). Unidentified fragment with wood grain on one side (L 17mm, W 12mm, Th 2mm).
2789 context 539 (7442). Unidentified fragment (L 14mm, W 14mm, Th 5mm).

Phase 5

1424 context 351. Unidentified lump, possibly a circular disc (D 9mm).
1537 context 219. Unidentified lump (L 20mm, W 12mm, Th 5mm).
1664 context 010. Unidentified lump (L 27mm, W 19mm, Th 14mm) with impressions of organic material.
1758 context 351. Unidentified fragment (L 12mm, W 9mm, Th 5mm).
1785 context 534. Unidentified lump (L 24mm, W 17mm, Th 9mm).
2297 context 532. Unidentified heavy lump (L 24mm, W 20mm, Th 15mm).
2385 context 386. Unidentified lump (11mm × 6mm).
2418 context 315. Unidentified curved fragment (L 24mm, W 15mm, Th 5mm).
2419 context 315. Unidentified lump (L 15mm, W 13mm, Th 8mm).
2462 context 308. Unidentified lump (L 18mm, W 9mm, Th 8mm).
2464 context 308. Unidentified curved lump (L 20mm, W 15mm, Th 6mm).
2552 context 315. Small unidentified lump (L 12mm, W 10mm, Th 8mm).
2598 context 308. Unidentified lump (L 18mm, W 13mm, Th 4mm).
2600 context 308. Unidentified lump (L 24mm, W 18mm, Th 4mm).
2620 context 308. Unidentified lump (L 18mm, W 11mm, Th 2mm).

Phase 6

1442 context 357. Unidentified lump (L 14mm, W 11mm, Th 8mm).
1572 context 367. Unidentified fragment (L 20mm, W 13mm, Th 5mm).
2522 context 341. Unidentified lump (L 21mm, W 8mm, Th 7mm).
2547 context 367. Unidentified lump (L 22mm, W 14mm, Th 5mm).
2550 context 350. Mass of tiny corroded fragments from a former object.
2551 context 341. Unidentified fragment (L 16mm, W 10mm, Th 4mm).
2667 context 373. Unidentified lump (L 18mm, W 13mm, Th 6mm).

Phase 7

1193 context 327. Unidentified lump (L 17mm, W 16mm, Th 7mm), possibly a nail-head.
1466 context 214. Unidentified lump (L 36mm, W 22mm, Th 10mm).
2595 context 311. Unidentified fragment (L 14mm, W 13mm, Th 2mm).
2596 context 311. Unidentified lump (L 14mm, W 10mm, Th 8mm).
2663 context 204 (6558). Unidentified lump (L 24mm, W 20mm, Th 10mm).
2779 context 206 (6596). Unidentified lump (L 11mm, W 7mm, Th 5mm).
2780 context 206 (6598). Unidentified fragment in two pieces (L 15mm, W 6mm, Th 2mm).

Phase 8

1084 context 054 (13.00E, 111.10N). Unidentified lump (L 22mm, W 14mm, Th 5mm).
1438b context 355. Unidentified lump (L 21mm, W 9mm, Th 4mm).

Phase 9

1014 context 024 (13.65E, 109.60N). Unidentified lump (L 14mm, W 10mm, Th 8mm).
1085 context 041. Unidentified lump (L 23mm, W 20mm, Th 15mm).
2507 context 070 (6080). Unidentified fragment (L 25mm, W 20mm, Th 3mm).

15.16 Iron concretions

Unstratified

1007 context 001. Broken beach cobble with iron concretions forming a triskele pattern (three lines curving clockwise from a central point) and another iron concretion on the side of the stone. This was initially thought to have been the rusted remains of a triskele-shaped iron artefact but is probably a fortuitous pattern of rusted ironwork.

16 The stone artefacts

M. Parker Pearson

with contributions by G.D. Gaunt, C. Paterson, M. Edmonds and K. Martin

16.1 Introduction

M. Parker Pearson

One of the implications of archaeological sites on machair sand is that every piece of stone found during excavations has to have been brought to the site by human agency. At Cille Pheadair some stone – such as the steatite – had been brought hundreds of miles, whereas the vast majority of stones were probably carried only from the nearest area of beach. Amongst the latter were the building stones used to revet the enclosure wall and the interior walls of the houses.

The building stones uncovered during the excavations were all waterworn except for a small number that formed the eastern wall of House 700, the first stonewalled house, and others that were (re-)incorporated into the lower courses of the walls of the subsequent longhouse, House 500. These roughly hewn stones might have been robbed from a nearby earlier structure, such as an Iron Age building. Before the Viking period, buildings in South Uist were constructed of stone obtained from the living rock, either from rocky promontories such as Ardvule (from which Dun Vulan was built; Parker Pearson and Sharples 1999) or from the hills inland and the cliffs on the east coast. The use of waterworn stones at Cille Pheadair thus represents a significant break in building traditions.

This change to greater use of rocks collected from the beach may signify a lack of concern for former methods of quarrying and working building stone, in which the selection of stone from specific, suitable land sources was highly regarded. Alternatively, or additionally, beach stones might have been associated with the power of the sea – the source of food, long-distance trade and exotic artefacts, kin ties, and alliances and adventure in the Norse world.

As we excavated the site we were very conscious that every stone was, at the very least, a manuport and consequently was of potential significance in understanding those ancient lives. We noticed that common finds on sites of earlier periods – such as pumice and stone pounders – were rarities at Cille Pheadair. In contrast, new materials, formerly unseen – such as slate and steatite – were present (Table 16.1). Perhaps the oddest 'artefacts' were the hundreds of tiny beach pebbles, mostly of white quartz, that were present in very high numbers within some of the house floors. Similarly, we were also surprised by the quantity of struck flint, hitherto found only on Neolithic and Bronze Age sites on the island and generally in smaller quantities than in this Norse-period context.

The most interesting absent class of stonework – entirely missing from Cille Pheadair – is the quern. Unlike Iron Age settlements or post-medieval farmsteads in South Uist, Cille Pheadair produced not a single fragment of a quernstone. In the Norse period grain was undoubtedly taken to water mills up in the hills or astride the island's streams. Yet despite extensive survey in the blacklands and hills of South Uist (Parker Pearson 2012b), no-one has yet found any remains that are likely to be those of a Norse water mill. The complete absence of querns from Cille Pheadair is a strong corroboration of the existence of such water mills, however, and of the potential implications for the centralizing of power over food production in the Norse period.

16.2 Beach-derived architectural stone

M. Parker Pearson

As discussed above, the vast bulk of the architectural stonework was derived from beach deposits. The nearest outcrops of stone are visible from the site on the promontory or tidal island of Orosay (Orosaidh), from which a short boat trip of a mile or so would have been sufficient to bring quarried building stone to Cille Pheadair. Instead, building stone was chosen from among the cobbles lying on the beach, which might have been as far away as a kilometre at that time. Only three stones are classed as architectural fragments with features of note.

Phase 4

1767 context 387 (8.80E, 112.70N). Stone (L 255mm, W 243mm, Th 76mm) of gneiss decorated with three

Table 16.1. Distribution of stone artefacts by phase

	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Phase 7**	**Phase 8**	**Phase 9**	**Unstratified**	**Phase 0 (*Pictish cairn*)**
Quartz pebbles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No		
Slate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes		
Flint	No	Yes	Few	Many	Yes	Yes	Many	Yes	Yes		
Pumice	1			4	2		6		1		
Steatite artefacts		1									
Steatite vessel sherds	1	6		1	1						
Steatite spindle whorls				3	1			2			
Local hones				1		1	4			1	
Imported hones	1			2	1					1	
Imported stone artefacts (not incl. hones)				1			1				
Beach stone artefacts (not incl. hones)	1	1	2	3	9	3	8	3	1		1
Architectural beach stone				1			1	1			

circular black smudges (two of them penannular) ranging between 36mm and 62mm dia. They resemble the carbon deposits left by a candle's flame. The stone was found in the passageway between House 500 Stage I and its north room (Structure 353) (Figure 16.1).

Phase 7

1061 context 060 (8.00E, 101.00N, 6.41OD). Threshold stone (L 520mm, W 394mm, Th 145mm) of gneiss with a semi-circular pattern of wear on one half of its top side. This stone was found just inside the doorway on the floor (060) of the earliest phase of Outhouse 006's construction and use (Figure 16.1).

Phase 8

1021 context 004. Stone (L 420mm, W 318mm, Th 76mm) of gneiss with a concave surface on its top side. It is probably a threshold stone, worn with the tread of many feet, but might have been used for grinding. It was found within the uppermost floor of Outhouse 006 (Figure 16.1).

16.3 Beach-derived stone artefacts

M. Parker Pearson

The stone assemblage from Cille Pheadair (Table 16.1) includes 30 artefacts of local beach stone (a further two stones listed in the catalogue below are probably not worked). An additional seven hones of local stone are listed separately in section 16.5, below. This assemblage is almost as large as that from Iron Age Dun Vulan (Parker Pearson and Sharples 1999: 230–2). The range of tools from Dun Vulan is restricted, and the range from Cille Pheadair is even more so.

The tool types made from local beach stone are hones, cobble tools, grinding stones and stone rubbers and polishers. The chronological distribution of these artefacts is interesting because it is different to that of imported hones and steatite artefacts. The latter are largely absent after phase 4, whereas it is only then that the locally made beach stone artefacts become common.

The vast majority of these locally procured tools are stone polishers or rubbers. There are only two hammerstones, a

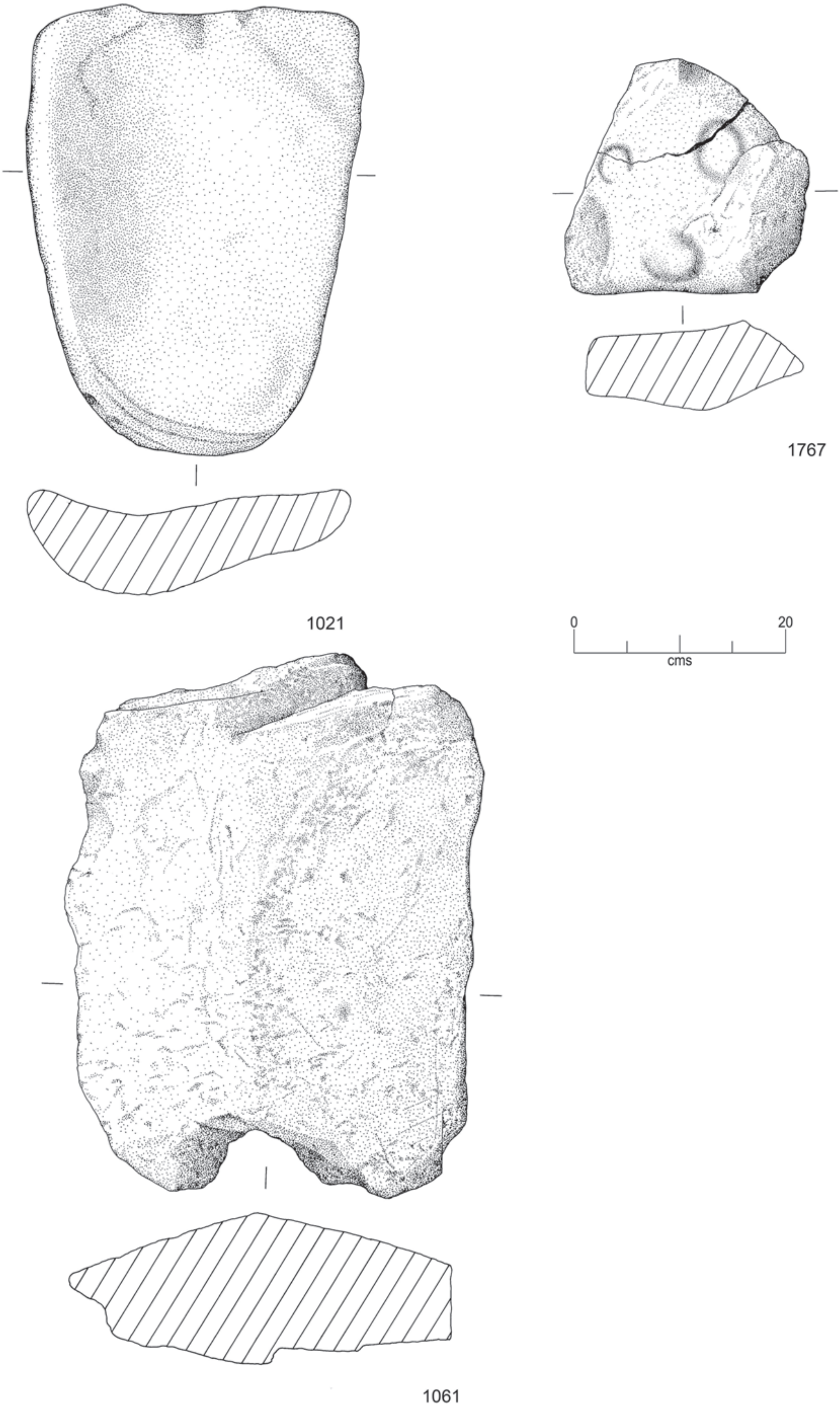

Figure 16.1. Architectural stone

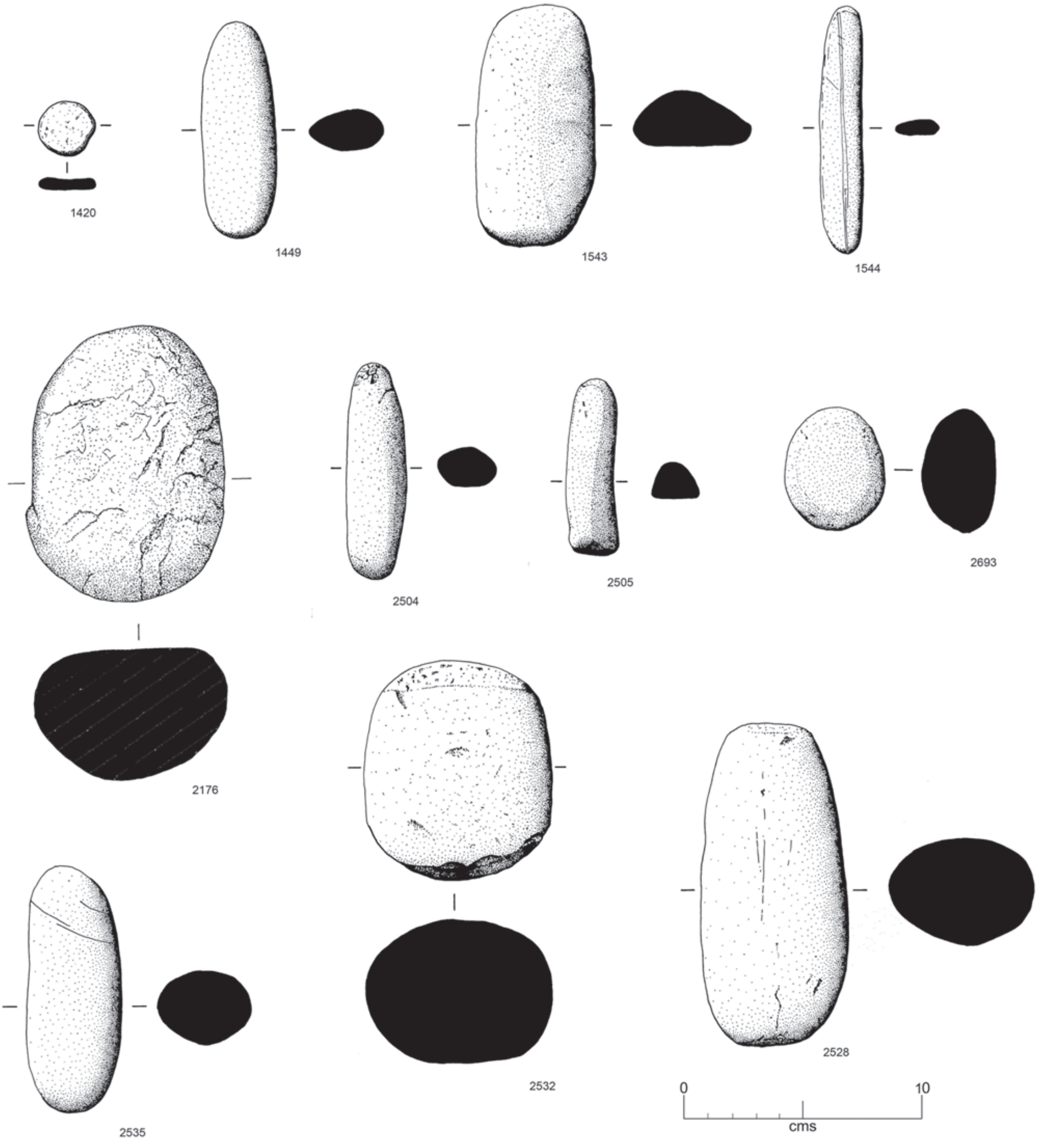

Figure 16.2. Modified beach stones

type very common from the Pictish Iron Age settlements at Dun Vulan and Bornais (Sharples 2012b). Presumably there was less need for these in the Norse period because of the greater availability of iron hammers. Six of the stone tools could have been used for grinding foodstuffs or other materials.

The majority of these tools came from midden layers but a small number were found on or within house floors. The distribution plots showing worked stone artefacts from house floors are:

- phase 4 House 500 Stage I: Figure 6.47,
- phase 7 House 312: Figures 9.39–9.40,
- phase 8 House 007: Figure 10.30.

Those stone tools within House 500 Stage I (phase 4) were located in the northwest quarter of the main room, close to the northwest corner of the hearth. Those within House 312 (phase 7), including the hone SF 2534, were found in the northwest quarter of the house along the north side of the hearth. If these artefacts were discarded during the houses'

occupation – which is most likely given their locations sandwiched below floor layers – then they may indicate that blades were sharpened within the deeper recesses of the house at the end of the hearth furthest from the door.

Phase 0 (Pictish cairn)

2207 context 904. Unmodified beach cobble (L 85mm, W 70mm, Th 45mm) found in the grave beneath the Pictish cairn, near the groin of the skeleton (see Figure 2.15).

Phase 1

1148 context 323. Small, broken-off tip (L 29mm, W 18mm, Th 22mm) of an elongated beach pebble shaped like a fingertip. It is not hone-shaped and has no evidence of use. Uncertain lithology; a fine granular texture suggesting an indurated siltstone, like hone SF 1431 but without any large angular quartz crystals.

Phase 2

2176 context 453. Heavily burnt beach cobble (L 115mm, W 83mm, Th 55mm) which has been worn smooth on one side from use as a rubber or polisher (Figure 16.2).

Phase 3

2758 context 701. Gneiss beach pebble trimmed into a circular shape (D 56mm, Th 12mm) and polished flat on both sides as a smoother.

2759 context 701. Broken fragment of an igneous beach pebble (L 60mm, W 24mm, Th 20mm), polished on one of its uneven surfaces.

Phase 4

2504 context 548 (7079). Black pebble (L 89mm, W 23mm, Th 13mm) used as a polisher on one or more surfaces (Figure 16.2).

2505 context 548 (7072). Grey pebble (L 73mm, W 19mm, Th 15mm), with reddish burnishing along one length (Figure 16.2).

2528 context 548 (7075). Hammerstone. Red sandstone beach cobble (L 130mm, W 62mm, Th 45mm), with both ends used for pounding. Its flat surfaces might have been used for smoothing (Figure 16.2).

Phase 5

1533 context 219. Beach pebble (L 98mm, W 52mm, Th 28mm) with slight polish on both flat sides.

1543 context 114. Beach pebble (L 100mm, W 50mm, Th 22mm) with one of its flat sides ground to a slightly concave surface (Figure 16.2).

1544 context 351. Thin beach pebble (L 104mm, W 18mm, Th 8mm), polished from wear on both sides (Figure 16.2).

1420 context 351. Small, flat, circular pebble (D 23mm, Th 5mm) whose edges are polished so that it resembles a gaming counter (Figure 16.2).

1547 context 114. Beach cobble (L 122mm, W 35mm, Th 28mm) used as a whetstone or stropping stone on two sides.

1595 context 023. Beach pebble (L 72mm, W 31mm, Th 16mm) with polish marks on both sides.

1596 context 023. Broken tip of a thin beach pebble (L 32mm, W 18mm, Th 9mm) with polish on both flat surfaces.

2530 context 118. Small flat, oval stone of gneiss (L 90mm, W 78mm, Th 20mm) used as a grinding surface on both sides.

2531 context 117. Small oval cobble (L 105mm, W 65mm, Th 27mm) with polishing marks on both surfaces.

Phase 6

1449 context 341 (8.90E 109.48N). Thin pebble (L 90mm, W 30mm, Th 16mm) highly polished on its slightly concave side (Figure 16.2).

1474 context 367 (10.56E 107.36N 6.21 OD). Flat gneiss stone (L 196mm, W 190mm, Th 48mm) with one flat surface partially smoothed slightly concave through grinding.

1550 context 376. Broken beach cobble (L 42mm, W 30mm, Th 30mm) with polish marks along two of its edges.

Phase 7

1131 context 311. Broken tip of an elongated pebble (L 50mm, W 28mm, Th 15mm) with one surface worn from polishing.

1149 context 311. Broken end of a cobble (L 52mm, W 38mm, Th 36mm) with one side polished.

1254 context 203. Broken end of a bar-shaped stone that appears shaped but may be an unaltered elongated pebble (L 62mm, W 30mm, Th 15mm). It appears to be polished along its thin sides. Microgranite, mottled greyish white, containing quartz, white feldspar and biotite, possibly with sparse muscovite and a black non-micaceous mineral, possibly hornblende. Much of the biotite is mutually aligned (parallel to the two large flat surfaces of the item), illustrating slight foliation. There are two possible Outer Hebridean sources: (i) potash-rich granites in South Uist and Barra (Johnstone and Mykura 1989: 24); (ii) Uig Hills Complex in western Harris and Lewis (Johnstone and Mykura 1989: 26, fig. 5). This item is too coarsely crystalline and contains insufficient quartz for it to have been used as a hone (Figure 16.3).

1519 context 205 (6864). Beach pebble (L 166mm, W

66mm, Th 38mm) with a concave surface used as a stropping stone.

2535 context 205 (6724). Pebble (L 103mm, W 40mm, Th 29mm) with polish along a slightly concave, long edge (Figure 16.2).

2536 context 205 (6724). Oval pebble (L 97mm, W 65mm, Th 28mm) with one side worn flat from rubbing or grinding.

2693 context 214 (6697). White quartz oval pebble (L 50mm, W 42mm, Th 30mm) with one surface (31mm x 28mm) polished flat (Figure 16.2).

2533 context 375. Small broken pebble (L 69mm, W 31mm, Th 15mm) with polishing striations on its convex side.

Phase 8

1195 context 092. Highly polished small black pebble (L 42mm, W 25mm, Th 16mm). It could be described as a 'worry-stone'.

1535 context 007. Gneiss beach cobble (L 320mm, W 140mm, Th 75mm) with a concave face that appears to have been used as a grinding surface.

2532 context 004 (sample square 4). Hammerstone. Beach cobble (L 88mm, W 76mm, Th 55mm) with pecking at both ends (Figure 16.2).

Phase 9

1111 context 090. Split gneiss beach cobble (L 186mm, W 189mm, Th 25mm) whose concave smooth side has been used as a grinding surface.

16.4 Imported stone

M. Parker Pearson and G.D. Gaunt

The imported hones, the imported steatite and the imported flint are listed in sections 16.5–16.7, below. Two further objects in the assemblage are also imports, since they do not derive from local stone sources.

Phase 4

2761 context 565 (7484). Small broken oval lump of chalk (L 29mm, W 19mm, Th 8mm). It is not obviously an artefact but must have been brought from a long way away.

Phase 7

1125 context 316. Stone fragment with part of one flat, polished surface surviving (L 58mm, W 30mm, Th 17mm). Sandstone, pale greyish brown, fine to (less commonly) medium-grained with subangular to subrounded grains, moderately sorted, well compacted. The only sandstones in the Outer Hebrides known to GDG comprise the Triassic Stornoway Formation, confined to the area around Stornoway, but they are red to purple in colour. This item is, therefore, presumably from the mainland, where the most likely source is the Cambrian Eriboll Sandstone Group (Johnstone and Mykura 1989: 42–7).

16.5 Hones

G.D. Gaunt with M. Parker Pearson

Hones occur in phases 1 and 4–7 but not in the later phases 8 and 9. This later absence may be due to the relative under-representation of contexts in phases 8 and 9. References to the distribution plots showing the hones' locations within house floors are given above

Schist hones

Phase 4

2048 context 144. Broken, well used hone (L 62mm, W 18mm, Th 12mm). Schist, pale brownish grey, fine-grained, well lineated, quartz-muscovite, with extremely sparse elongate pale green translucent mineral parallel to the lineation, probably chlorite. No obvious foliation is visible (Figure 16.3).

2078 context 475. Small broken hone, well used (L 45mm, W 13mm, Th 8mm). Schist, pale grey with appreciable small diffuse pale brownish grey patches, fine-grained, well lineated, quartz-muscovite, with extremely sparse elongate pale green translucent mineral parallel to the lineation, probably chlorite. No obvious foliation is visible (Figure 16.3).

Phase 5

1417 context 351. Broken, well used hone (L 109mm, W 14mm–25mm, Th 8mm), with one end spatulate with a chisel-shaped edge, tapering towards the thinner snapped end. Schist, pale brownish grey, fine-grained, well lineated, quartz-muscovite, with extremely sparse elongate pale green translucent mineral parallel to the lineation, probably chlorite. It has a 2mm-thick pale grey layer crossing through it parallel to the lineation.

Comments

These three items are lithologically identical to Eidsborg Schist (also known as Norwegian Ragstone) except for the pale brownish grey colour of SF 2048 and SF 1417 and the similarly coloured patches on SF 2078. Undoubted Eidsborg Schist is consistently pale grey to (less commonly) pale-to-medium grey, both at outcrop in Norway and as hones imported into Britain, whether found in reducing conditions (*e.g.* Coppergate), in calcareous conditions (*e.g.* Wharram Percy) or in oxidizing conditions (*e.g.* weathered surface occurrences). Out of 241 otherwise lithologically identical schist hones seen by GDG from York alone, only two have a pale brownish grey (as distinct from grey) colour. One is categorized as '?Norwegian Ragstone type' (Mainman and Rogers 2000: 2651, no. 9514). The other is merely listed in the final publication as 'Norwegian

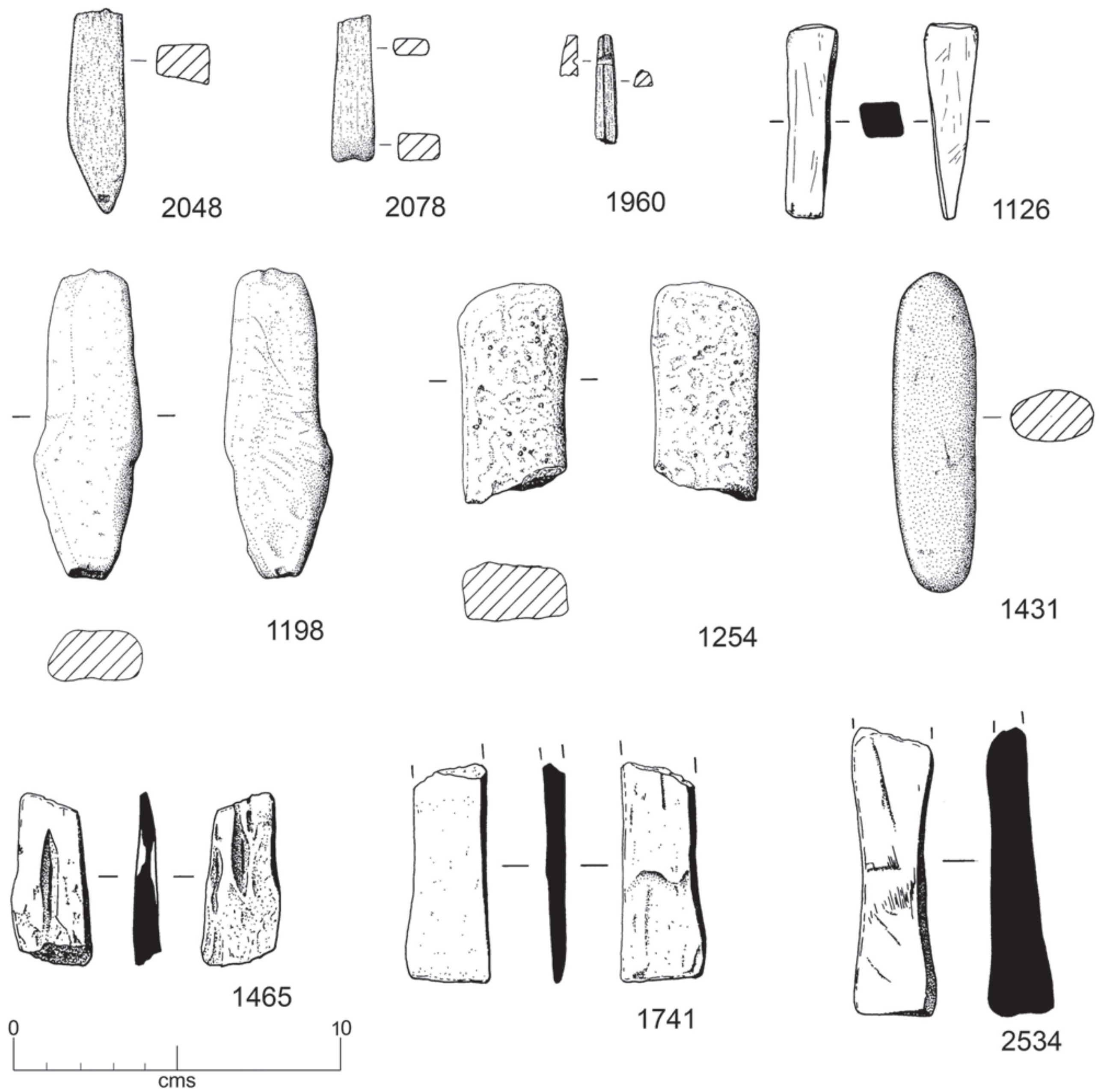

Figure 16.3. Hones

Ragstone type' along with several others for which an element of doubt should have been included (Ottaway and Rogers 2002: 3017 no. 10917).

There may be some reason for the pale brownish grey coloration that is peculiar to these Cille Pheadair hones, such as salination or burning. Alternatively, because most of the Scottish Highlands and islands consist of a wide variety of metamorphic rocks, it is not quite inconceivable that the three hones are from this region. Because of this slight doubt about their colour, they are best referred to as 'probably (or almost certainly) Eidsborg Schist'. A potassium-argon determination of their metamorphic age would resolve this slight uncertainty.

Phyllite hones

Phase 1

2182 context 762. Partially drilled hone (L 29mm, W 18mm, Th 6mm) with a conical hole (D 4mm) that does not quite perforate the full thickness of the stone but cuts through a thin horizontal incised line at the top of the hone. There is a tiny hole on the other side of the conical perforation where drilling has started but was abandoned. This presumably would have been a truncated pendant hone but its length is rather short. Phyllite, medium grey, very fine-grained, well lineated, quartz-muscovite. Purple Phyllite (of Crosby and Mitchell 1987, also known as Blue Phyllite of Moore 1978).

Unstratified

1960 unstratified. Split pendant hone fragment (L 33mm, W 7mm, Th 5mm) with a cone-shaped notch towards one end, broken across the lineation and across the perforation. Phyllite, medium grey, very fine-grained, well lineated, quartz-muscovite. Purple Phyllite (of Crosby and Mitchell 1987, also known as Blue Phyllite of Moore 1978) (Figure 16.3).

Comments

The provenance of Purple Phyllite hones is as yet uncertain, with possible sources in Norway, Germany or elsewhere in central Europe, Scotland or Greenland having been considered (Moore 1978; Crosby and Mitchell 1987). Like Eidsborg Schist hones, Purple Phyllite hones are regarded as indicators of Viking links, directly or indirectly, and the two hone types are commonly found together on sites dating up to the eleventh century, after which (unlike Eidsborg Schist hones) the incidence of Purple Phyllite hones declines markedly. Crosby and Mitchell (1987: 490–91) refer to a hone from Barra which they consider to be Purple Phyllite despite 'its brown coloration'. The presence of undoubted Purple Phyllite hones at Cille Pheadair enhances the probability that the three schist hones are of Eidsborg Schist but I would still urge a slight element of doubt in this respect.

Beach pebble hones of uncertain lithology

Phase 4

2080 context 569. Large hone (L 117mm, W 25mm, Th 15mm) on a probably natural elongate pebble, worn on one side to a concave edge towards its tip. Uncertain lithology; medium to dark grey, with traces of a minute-scale texture suggesting mutual alignment of components that could be either slaty cleavage in a metasiltstone or micro-flow structures in a lava. This alignment has produced fissility along which some splitting has occurred.

Phase 6

1465 context 369. Broken tip of a hone (L 54mm, W 23mm, Th 8mm) worn to a sharp edge at one end. Narrow grooves have been cut along the centres of each flat side. These could be derived from sharpening needles (Figure 16.3)

Phase 7

1126 context 201. Hone (L 59mm, W 15mm, Th 15mm–2mm) heavily worn on all four sides and tapering at one end almost to a point (Figure 16.3).

1431 context 204. Thin, elongated pebble (L 98mm, W 25mm, Th 15mm) of hone shape. The slight concavity on its flattish face suggests slight use. Uncertain lithology; medium (slightly greenish) grey, with traces of a very fine granular texture suggesting an indurated siltstone, but also with randomly orientated minute dark thin elongate components and a few large angular crystals up to 4mm long, apparently of quartz, both aspects of which suggest a porphyritic igneous rock. One reconciling possibility is a tuff (*i.e.* a volcanic ash). The nearest examples known to G.D.G are on Skye (Figure 16.3).

1741 context 209. Broken end of a hone (L 66mm, W 24mm, Th 7mm), worn and slightly concave on the two thin sides (Figure 16.3).

2534 context 214 (6886). Hone (L 83mm, W 23mm, Th 20mm) worn to concave surfaces on all four sides (Figure 16.3).

Unstratified

1198 unstratified. Elongated beach pebble (L 92mm, W 31mm, Th 17mm). One surface may just conceivably be worn by honing. Uncertain lithology; apparently similar lithologically to SF 1431 (very fine granular texture suggesting an indurated siltstone) but without any large angular crystals (Figure 16.3).

16.6 Steatite

C. Paterson

With the arrival of the Norse in the North Atlantic came not only steatite vessels from the Norwegian homelands but a revival in quarrying this resource from Shetlandic outcrops (Forster 2006). Its presence at Cille Pheadair is therefore diagnostic of Norse influence.There are 16 steatite artefacts or fragments from Cille Pheadair. They can be divided into three artefact types: spindle whorls (six), a line sinker and broken vessel fragments (nine). All except two of the artefacts were recovered from phases 2–5. The exceptions are two spindle whorls from phase 8. For the distribution plot of the steatite artefacts from the phase 4 house floor, see Figure 6.19.

Spindle whorls

Phase 4

1996 context 548. Irregularly worked discoidal spindle whorl with approximately straight sides and flat upper and lower surfaces, both of which exhibit fine tooling (D 37mm, H 13mm, Hole D 10mm) (Figure 16.4).

2004 context 504. Irregularly worked discoidal spindle whorl with lightly curved sides and flat upper and lower surfaces, the blackened appearance of which suggests that it was made from a reused pot sherd (D 30mm, H 12mm, Hole D 7mm) (Figure 16.4).

2076 context 569. Dome-shaped spindle whorl with flat base and lightly conical upper surface (D 32mm, H 9mm, Hole D 9mm). Both surfaces carry crudely incised decoration. There are three irregular concentric rings on the upper surface, with a ring of dots positioned between the second and third concentric rings from the perforation.

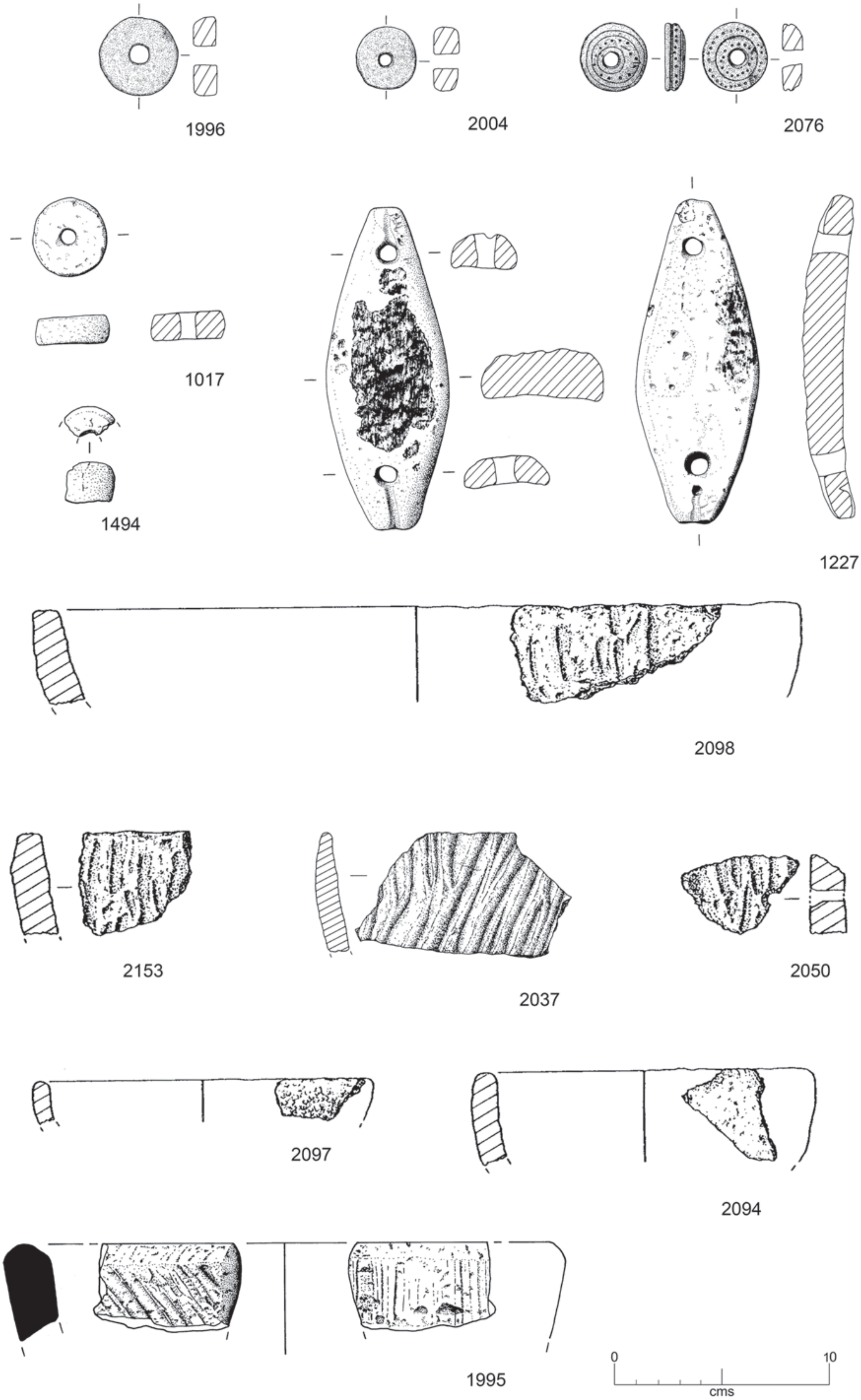

Figure 16.4. Steatite artefacts

A further ring of dots decorates the sides, below which is a prominent groove. Two further rings of dots separated by a concentric ring decorate the base. The combination of concentric rings with dots is found on bone artefacts of a similar shape, including playing pieces and a discoidal bone spindle whorl, from twelfth/thirteenth-century deposits at Coppergate (Walton Rogers in MacGregor *et al*. 1999: fig. 922.6693). The crude nature of the incised decoration on the above whorl may be on account of such ornament normally associated with bone artefacts being applied to soapstone, with the distinction that this stone example has simple dots, as opposed to ring-and-dots (Figure 16.4).

Phase 5

1630 context 308. Approximately half of an irregularly worked discoidal spindle whorl with approximately flat surfaces and lightly curved sides (D 27mm, H 9mm, Hole D 7mm). Traces of soot indicate that the whorl was most probably made from a steatite vessel fragment.

Phase 8

1017 context 004. Irregularly worked discoidal spindle whorl with straight sides and flat upper and lower surfaces (D 36mm, H 14mm, Hole D 8mm). Both surfaces exhibit fine tooling (Figure 16.4).

1494 context 108 . Whorl fragment, probably a spindle whorl 17mm thick and originally *c*. 30mm diameter with a central hole *c*.11mm diameter (Figure 16.4).

Steatite was the predominant material for spindle whorls in Norway (Petersen 1951: 304) and steatite spindle whorls have been recovered from Norse-period sites throughout Shetland. There are also numerous examples from Orkney, with 12 examples from Quoygrew, Westray (Barrett 2012: 217) and over 20 from Pool, Sanday, where several of the spindle whorls had been refashioned from vessel sherds as indicated by traces of soot (Smith and Forster 2007: 428–30). Steatite spindle whorls have also been found in the Western Isles, including seven from the Viking Age longhouse at Drimore, South Uist (MacLaren 1974: 14).

Soapstone weight or linesinker

Phase 2

1227 context 334. Weight of elliptical form with a perforation in each tapering side from which a groove leads to the truncated ends (L 150mm, W 57mm, Th 22mm). There is an additional groove on the underside that leads from one truncated end to a shallow circular depression positioned close to the perforation on that side. The weight is slightly bowed, but for a roughly tooled, sooted area on its upper surface; there are also traces of soot along one edge of its concave underside. Apart from the rough patch on the upper surface the piece is finely worked (Figure 16.4).

The elongated form of this example with its two perforations for securing rope is paralleled by one of Petersen's type specimens from the late Viking period from Vestfold, Norway (1951: fig. 144), which is thought to have been used for 'trolling'. Such soapstone linesinkers are found at several Norse sites in the Northern Isles including Jarlshof (Hamilton 1956: pl. XXXVII:3), an unfinished example from Quoygrew, Westray (Barrett 2012: 217, fig. 12.9:6557) and examples from both the Brough of Birsay (Curle 1982: 81, ill. 54.587) and Pool, Sanday (Smith and Forster 2007: 423–4, ill. 8.5.8) in Orkney, which have been fashioned from fragments of steatite cooking vessels as evidenced by soot surviving on external surfaces. On account of this Andrea Smith has questioned their identification as linesinkers, reasoning that prolonged exposure to the sea would have removed such traces. The roughly worked sooty patch on the upper surface of the Cille Pheadair weight, together with traces of soot elsewhere, suggests that this artefact has likewise been reworked from a substantial vessel fragment.

Amanda Forster identifies the original vessel as probably having been a flat, four-sided vessel, which would indicate that it was manufactured in Shetland sometime after AD 950. This form of linesinker was in use for several centuries, as illustrated by a similar find from the Biggings, Papa Stour (Smith *et al.* 1999: 141, ill. 61).

Soapstone vessel fragments

Dating of steatite vessels was traditionally based on their morphology, with a typological sequence developing from the fine Norwegian hemispherical bowls to coarser Shetlandic four-sided vessels, which were dated late in the sequence. However, the wealth of steatite vessels excavated from Pool, Sanday, which amounted to over 66kg, or over 422 fragments, has revealed fragments of heavily tooled four-sided vessels dating from the second half of the tenth century (Forster 2006: 70; Smith and Forster 2007: 432). This form, which was indigenous to Shetland and developed in response to the laminar outcrops on the islands (Forster 2006: 57; Batey *et al.* 2012: 214), is represented by at least four of the Cille Pheadair fragments. Other fragments belong to hemispeherical bowls of various sizes.

The limited number of steatite vessel fragments, four of which probably came from a single vessel, suggests that soapstone bowls were not commonplace at Cille Pheadair, which contrasts with contemporary sites in the Northern Isles where such finds are numerous (Hamilton 1956; Buttler 1989; Smith and Forster 2007; Batey *et al*. 2012). The reuse of steatite vessel fragments, refashioned into other artefacts such as spindle whorls and the probable linesinker, indicates that the stone was valued and recycled accordingly.

Phase 1

2153 context 587. Rim fragment of a steatite vessel (L 58mm, W 52mm, Th 20mm), with irregular vertical toolmarks on its burnt outer surface and slightly scoured short diagonal tooling on the inside. The rim is approximately flat, but is coarsely worked and curves slightly inwards. The profile and tooling of this fragment are remarkably similar to SF

2098, and it is probable that both fragments (and possibly also SFs 2037 and 2050) belonged to a four-sided vessel of Shetlandic origin (Amanda Forster, pers. comm.) (Figure 16.4).

Phase 2

2037 context 649. Coarsely worked rim fragment (L 192mm, W 124mm, Th 22mm) of a four-sided steatite vessel, with irregular vertical toolmarks on its burnt outer surface. The inside is scoured smooth, possibly through cleaning, though smoothed toolmarks are still visible on the upper 60mm of the interior beneath the rim. This is probably from the same vessel as SFs 2050, 2098 and 2153, perhaps of Shetlandic origin (Figure 16.4).

2050 context 649. Coarsely worked body fragment of steatite vessel (L 58mm, W 42mm, Th 18mm) with irregular vertical toolmarks on its burnt outer surface, while the inside is scoured smooth, possibly through cleaning. There is iron corrosion in a broken perforation, which is most probably from a repair, rather than for securing a handle, as this is not a rim fragment, probably coming from lower down in the vessel (Amanda Forster, pers. comm.). Similarities in the appearance of this fragment, and its worn outer tooling in particular, suggest that it might have belonged to the same vessel as SFs 2037, 2098 and 2153, which was probably a four-sided vessel of Shetlandic origin (Amanda Forster, pers. comm.) (Figure 16.4).

2094 context 618. Bowl rim fragment of a steatite vessel (L 50mm, W 32mm, Th 14mm). Originally the bowl had a diameter of *c*. 160mm (Figure 16.4).

2097 context 618. Small rim fragment of a thin-walled steatite vessel (L 43mm, W 24mm, Th 9mm). The rim has been damaged but appears to be slightly incurving. There are burnt deposits on the rough outer surface while the inside has been scoured, possibly through cleaning. Similarities in the appearance of this fragment and another thin-walled fragment (SF 1891) suggest that they both belonged to the same vessel (Amanda Forster, pers. comm.) (Figure 16.4).

2098 context 618. Coarsely worked rim fragment of a steatite vessel (L 102mm, W 58mm, Th 18mm) with irregular vertical toolmarks on its slightly sooted outer surface and remnants of short diagonal tooling on the inside. The rim is approximately flat, but coarsely worked and curves slightly inwards. The profile and tooling of this fragment are remarkably similar to SF 2153, and it is probable that both fragments (and possibly also SFs 2037 and 2050) belonged to a four-sided vessel of Shetlandic origin (Amanda Forster, pers. comm.) (Figure 16.4).

2175 context 618. Body fragment of a steatite vessel (L 58mm, W 38mm, Th 16mm) with a burnt outer surface and worn toolmarks on the inside.

Phase 4

1995 context 548 (7077). Bowl rim fragment (L 65mm, Th 38mm) with bevelled internal edge and deep angled incisions on the inside. Originally the bowl had a thickness of 20mm and a diameter of *c*. 260mm. One of the broken edges has been reworked and worn smooth (Figure 16.4).

Phase 5

1891 context 419. Small body fragment of a thin-walled steatite vessel (L 32mm, W 20mm, Th 11mm) with burnt deposits on its rough outer surface. The inside is smooth, probably from cleaning. Similarities in the appearance of this fragment and another thin-walled fragment (SF 2097) suggest that they both belonged to the same vessel (Amanda Forster, pers. comm.).

16.7 Flint

M. Edmonds and K. Martin

Almost all of the flint with cortex present can be identified as beach flint; just one example has an orange cortex deriving from gravels but even this might have been procured from beach deposits. The flint itself is nearly all grey, with a few brown and honey-coloured types. Sources of beach flint are known in the southern Inner Hebrides but not from the Western Isles. It is thus most likely to have been imported. Interestingly enough, the quantities of flint in use at Norse-period Cille Pheadair were probably greater than those at Bronze Age sites such as Cladh Hallan where worked quartz forms a substantial proportion of the lithic assemblage.

With the exception of a flint scraper (SF 1538) from 384 in phase 4 and another (SF 1904) from 547 in phase 5, none of the material appears to be prehistoric and thus residual in a Norse-period context (Figure 16.5). The assemblage of 271 pieces (not including SFs 1538 and 1904) appears to derive entirely from Norse-period fire-making. Amongst the small flakes and spalls there are 19 heavily retouched flints, of which three are flakes and the rest are core-like lumps from which flakes have been detached. Presumably the strike-a-lights were used in conjunction with iron to create a spark, with flakes occasionally being detached as by-products of the fire-making process.

Flint flakes and strike-a-light ‘cores’ are found in every chronological phase of the site from phase 2 onwards. They are particularly common in middens and in the floors of Houses 500 and 312. The distribution plots showing flint from house floors are:

- phase 3 House 700: Figure 5.7,
- phase 4 House 500 Stage I: Figures 6.18, 6.20, 6.22,
- phase 5 House 500 Stage II: Figures 7.9–7.10,
- phase 7 House 312: Figures 9.17, 9.20,
- phase 8 House 007: Figures 10.13–10.14,
- phase 9 huts: Figure 11.11.

Curiously enough, House 700 has only a few finds, from the house’s northern end and hearth. In contrast, there are

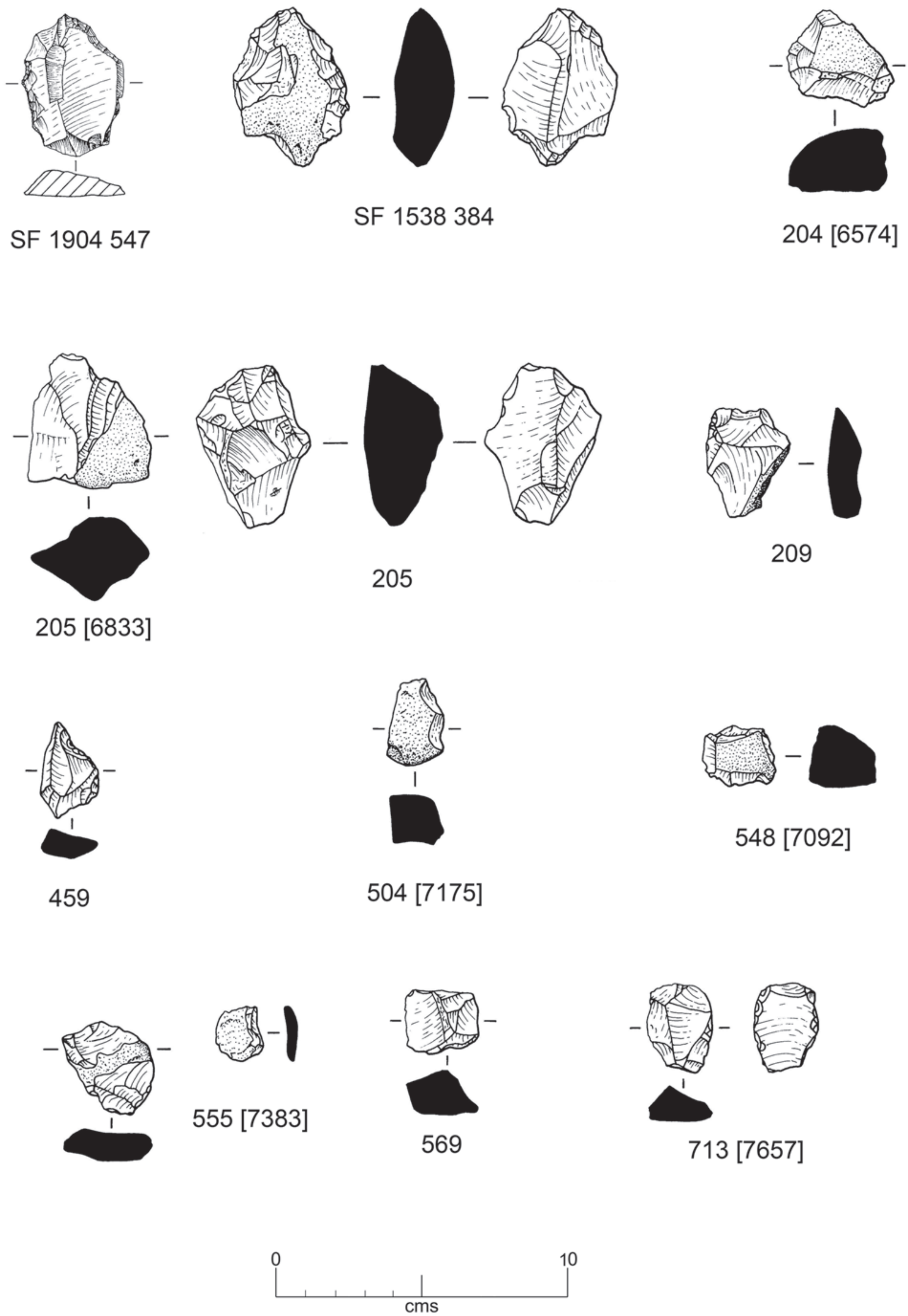

Figure 16.5. Worked flint

42 pieces from the floors in the two rooms of House 500 Stage I (phase 4).

Within House 312 flints share a distribution similar to that in House 500 with regard to the hearth and doorway. The overwhelming majority are around or within the hearth, with the densest concentrations at the hearth's west end (furthest from the door). The two strike-a-lights from House 500's floors and three of the four from House 312's floors are at the smaller end of the range, most of the larger ones having ended up in the midden.

Within House 007 there was only one strike-a-light, worked from a nodule, in floor layer 092. Its position relative to the doorway was not the same as that of the majority of flints within Houses 500 and 312, since it was found on the same side of the hearth as the doorway (in this particular case at the hearth's southwest corner). The debris of small flakes came from two areas, at the north end of the hearth and in the northeast corner of the house near the blocked doorway.

A very small number of flint flakes and strike-a-lights came from the outhouses and sheds. Two came from floors of Structure 353 (the north room of House 500). In phase 6, the floors of Shed 406 produced two strike-a-lights. Outhouse 006 in phase 7 had a flake within 060 on the east side of the hearth in an analogous position to the doorway (at the northeast corner of the outhouse). In the layer above (004, phase 8) within Outhouse 006, two flakes were also found, one in the hearth and one in the northeast corner.

In all cases except for House 007, the distribution of flints in houses supports the principle that fires are best lit where one is sat away from the door, thereby minimizing the impact of drafts or gusts of wind during the slow and tricky process of producing a spark and setting light to tinder. In the longhouses these areas are also the 'kitchen' zones.

16.8 Slate

M. Parker Pearson

There were 337 pieces of green slate recovered from Cille Pheadair and just eight pieces of grey slate. The green slate is known as Stulay slate and can be obtained locally from the east coast of South Uist and its small offshore island of Stulaigh (Stulay). The sizes of some of the 12 large pieces, together with the lack of waterworn surfaces, indicate that these were obtained from the outcrops rather than from beach cobbles. Sources of grey slate are more distant but the water-rounded surface of a piece from construction deposit 547 indicates that these few fragments were probably obtained from beach cobbles.

The grey slate was found in:

- a fill (605) of pit 604 in phase 1,
- from the layer 453 that built up on the sandbank in phase 2,
- from midden layer 422 (phase 4),
- from the fill (547) of House 500's Stage II wall (phase 5).

Green slate was found in all phases at Cille Pheadair from phase 2 through to 9 (except for phase 8, which produced only one fragment). It was found in all types of context, including house floors, construction fills, abandonment fills and midden layers:

- However, it was most prolific (123 pieces out of 337) in construction fills: the make-up layer (209) beneath House 312, the wall fills (530, 533 and 547) for House 500 Stage II, and the extension of the sandbank's north terminal (528) in phase 3.
- It also occurred in phase 2 construction layers 354 and 384, and in abandonment fills 351 and 517 (phase 5) and 367 (phase 6).
- Its second most common occurrence is in midden deposits (over 100 pieces), *e.g.* layer 219 (phase 5).
- The remainder of the fragments come from house floors in Houses 312, 500 and 700 (totalling 45 pieces); from a few other patchy house floors (414 and 512 in phase 5, and 044 in phase 9); from footpath 534 in phase 5; and from layers in the north end of the enclosure in phases 1 and 2 (582, 596, 600, 607, 618 and 620, totalling 37 pieces). Only two finds are from pit fills (524 and 605).

The distributions of slate fragments within the houses are of some interest although numbers are low. The distribution plots showing slate from house floors are:

- phase 3 House 700: Figure 5.8,
- phase 4 House 500 Stage I: Figures 6.20, 6.24,
- phase 5 House 500 Stage II: Figure 7.10,
- phase 7 House 312: Figures 9.17, 9.20.

In House 700's floor, the slate is distributed mostly in the area of the doorway with a second grouping within the northeast quarter, the area identified by other means as the 'kitchen'. In House 500, the overall patterning is broader with pieces in the south end and in the forecourt, although the majority are also in the northeast quarter. Within House 312 the pattern is slightly different with most pieces within the area of the hearth but not clustered at the western 'kitchen' end. A few pieces of slate from the midden were burnt to a brown colour but most appear not to have been heat-affected.

We may suggest that the slate fragments within the houses derive from pieces of slate that were used in kitchen activities, perhaps as surfaces for standing things or food items on. It is difficult to distinguish deliberate trimming and fashioning of slate from accidental damage and, although several pieces exhibit edge trimming that may be deliberate, only two pieces (SFs 1112 and 2179) can be definitely be considered as worked artefacts. SF 1112 is a semi-circular piece of green slate that might have been fashioned into a formerly circular plate, lid or platter, or a half-moon tool like the one made in bone (SF 2157 from 590; see Figure 14.6). Alternatively this was intended to be made as a semi-circular object. It was found in the windblown fill (200) of House 312.

The second very evident use of slate was for incorporation into construction fills but its efficacy or practicality in such contexts is not apparent since the quantities deposited in these fills were so limited in comparison with the volume of sand. Today, we value slate for its waterproofing qualities in keeping rain off roofs and wall-tops but its uses at Norse-period Cille Pheadair were very different.

Small finds

Phase 1

2179 context 709. Rectangular piece of worked grey slate (L 24mm, W 13mm, Th 4mm) with a thumbprint-sized concavity on one side worn smooth.

Phase 7

1112 context 200 (7112). Semi-circular object of green slate, a pot-lid, or possibly a plate, platter or tool. Broken but originally 125mm diameter and 10mm thick, crudely chipped around its edges (Figure 16.6).

Figure 16.6. A slate artefact

16.9 Pumice

M. Parker Pearson

In contrast to Iron Age and other prehistoric sites in South Uist and Barra (*e.g.* Parker Pearson and Sharples 1999: 232; Branigan *et al*. 1995: 145), there is very little pumice from Cille Pheadair. This no doubt reflects the increasing use of iron tools to carry out activities such as hide-scraping. Only 14 pieces were recovered and none have any obvious signs of working.

- One piece came from a layer (607) associated with the pits in phase 1.
- Another three were found in floor layers within House 500 Stage I (phase 4), at the north end of the hearth and east of the hearth (see Figure 6.47).
- Four came from the middens; one from the southeastern midden in phase 4 (133), two from the northeastern/eastern midden in phase 5 (layers 308 and 420), and one from the northwestern midden in phase 7 (322).
- Five were associated with House 312 in phase 7. One came from the make-up layer (209) beneath the house and the other four came from its floors (205 and 206) and fill (203). Two of these could be plotted; they were found at the west end of the long hearth (see Figure 9.41).
- A single piece came from a hut wall (073) in phase 9.

16.10 Quartz pebbles

M. Parker Pearson

During the excavation of House 312's floors we became aware of the large numbers of small white quartz pebbles, between 10mm and 30mm diameter, and wondered if they might have constituted the pieces of a 'poor man's' board game. We thus decided to keep them from then onwards and retrieve them from the heavy residues after flotation of environmental samples. There was total retrieval of pebbles from house floors and from all other flotation samples taken in other contexts. The latter were augmented by hand-collection of pebbles from those components of layers that were not processed by flotation.

The total number of pebbles recovered is 1,358, of which 483 are white and 805 are grey, with much smaller numbers of black (*n*=29), green (*n*=18), red (*n*=5), orange (*n*=20) and pink (*n*=1).

Numbers of white and grey pebbles recovered by flotation from middens and other non-house floor deposits are 27 white and 99 grey. In contrast, those hand-retrieved from the same contexts number 96 white and 27 grey. This difference in recovery is not surprising given the attractiveness and high visibility of the translucent white quartz pebbles. White pebbles are far rarer in local beach deposits than the more common grey quartz pebbles and thus the proportions of the two colours found in the heavy residues from non-house floor contexts are consistent with their proportions on the beach.

The proportions of different coloured pebbles recovered by flotation of the house floors is very different to the proportions from middens and non-floors. For the pebbles from the floors of Houses 312, 500 Stage I, 500 Stage II and 700, the numbers are 274 white, 413 grey, 14 black, 14 orange, 4 red, 3 green and 1 pink. White quartz pebbles thus constitute over a third of the assemblage, and their high proportion within house floors is unlikely to be due to chance. It is interesting that no pebbles were recovered from

the flotation samples taken from the floor of House 007.

A third class of context is the floors of outhouses, including the north room of House 500 (Structure 353). Here the pattern was different yet again. Whereas there were no appreciable quantities of pebbles in Outhouse 006, Shed 400 or Shed 406, numbers in the floors of Structure 353 were large, particularly of grey pebbles. In contrast to the large numbers of black and white pebbles in the main room of House 500, these grey pebbles might have come in attached to seaweed stored in the north room to be dried as fuel.

The distribution patterns of pebbles in Houses 500, 700 and 312 reveal concentrations in particular parts of the house and not in others. The distribution plots showing coloured pebbles from house floors are:

- phase 3 House 700: Figure 5.8,
- phase 4 House 500 Stage I: Figures 6.24,
- phase 5 House 500 Stage II: Figure 7.9,
- phase 7 House 312: Figures 9.17, 9.19.

The clustering of pebbles within the 'kitchen' area is a consistent feature of the house floors with large assemblages of pebbles (phases 3, 4 and 7; there are many fewer from phase 5). These are the densest concentrations in all three cases. Patterning within the rest of the living area is less consistent: there is, for example, a concentration of pebbles near the doorway in House 700 but not in House 312 or in House 500. This pattern might have been produced by different housework routines, with pebbles in House 700 being swept to the doorway zone.

The pebbles might have provided an extra bit of warmth by absorbing heat from the fire (though they are not heat-shattered). They might also have formed temporary arrangements as borders or defined surfaces, and/or they might have been the playthings of small children supervised in the kitchen area.

Most interesting is the possibility that different parts of House 500's floor were colour-coded, with a clustering of white pebbles within a particular area of that 'kitchen' zone. There is a reasonable possibility that this idiosyncratic distribution could have arisen from the activities and games of children, using pebbles either as gaming counters for board games or as stones to be thrown or gathered in less formal play. As described in Chapter 6, the approximately equal numbers of white and grey stones suggests such a use although they might have had a decorative purpose – whether this could be separated from their recreational use is impossible to gauge.

17 Industrial activity

D. Dungworth, M. Parker Pearson and H. Smith

17.1 Ironworking debris

D. Dungworth

Summary of ironworking evidence

The ironworking debris consists of waste slags and metal. The slags were categorized on criteria of morphology, density, colour and vesicularity, and each category was separately weighed. It should be stressed that many categories of ironworking slags form part of a compositional and morphological continuum. Only certain classes of material are strictly diagnostic and can be unambiguously assigned to a single metalworking process. Others may derive from a restricted range of processes but, when found in association with diagnostic types, may provide support for the identification of particular activities. Categories and the criteria on which they are based may vary between specialists; those used by English Heritage's Centre for Archaeology (now Historic England) are defined below.

A total of 3.2kg of ironworking (and possible ironworking) slags have been identified from the assemblage of large pieces hand-collected as small finds (Tables 17.1, 17.4). The categories of slag that have been identified from Cille Pheadair are smithing-hearth bottoms, vitrified lining, undiagnostic ironworking slags and fuel ash slags (see section 17.2, below). Significantly, no slags diagnostic of iron-smelting were identified. The proportions of the categories of metalworking slag identified are shown in Table 17.1. All of the debris that is diagnostic of a particular process was produced by iron-smithing. The proportion of vitrified hearth lining in the Cille Pheadair assemblage is rather low. Assemblages of ironworking debris that have been deposited close to where they were formed (*i.e.* in the immediate vicinity of a blacksmith's workshop) have higher proportions of vitrified hearth lining (5–10% by weight). This suggests that the Cille Pheadair assemblage was not deposited close to where it was formed and/or that it is redeposited.

Table 17.1. Types of ironworking slag from Cille Pheadair

Slag type	Weight (g)
Smithing-hearth bottoms	2259
Vitrified hearth lining	47
Non-diagnostic ironworking slag	920
Total	**3226**

Explanation of classification

Smithing-hearth bottoms are unlikely to be confused with the waste products of smelting and are therefore considered to be diagnostic of smithing. These hearth bottoms are recognizable by their characteristic plano-convex form, having a rough convex base and a smoother, vitrified upper surface which is flat, or even slightly hollowed as a result of the downwards pressure of the air blast. Compositionally, smithing-hearth bottoms are predominantly fayalitic (iron silicate) and form as a result of high-temperature reactions between the iron, iron-scale and silica from either the clay furnace lining or sand used as a flux by the smith.

The debris classed as *non-diagnostic ironworking slag* is dense (having a composition which is predominantly fayalitic) but the morphology of the slag lumps is irregular. Similar materials can be produced by either smelting or smithing operations. The presence of smithing-hearth bottoms in the assemblage and the lack of any smelting slags suggest that the undiagnostic slags from Cille Pheadair were produced by iron-smithing

Material listed as *vitrified hearth/furnace lining* can be formed during either iron-smelting, iron-smithing or non-ferrous metalworking as a result of a high-temperature reaction between the clay lining of the hearth/furnace and the alkaline fuel ashes or fayalitic slag. The material consists of fired clay that is vitrified on one side. The lack of smelting slags from the site indicates that the vitrified

Table 17.2. Iron-smithing debris by phase (weight in g)

Slag type	Phase									
	1	2	3	4	5	6	7	8	9	U/S
Undiagnostic	6	198	176	320	154	9	5	8	3	41
Smithing-hearth bottoms		1156	672		146	285				
Vitrified hearth lining		23		24						

Table 17.3. Iron-smithing debris by context type (weight in g)

Slag type	Phase 1	Phase 2	Phases 2–3	Phase 3		Phase 4		Phases 4–5
	Pit complex & within sand bank	*Construction/ levelling layers*	*Enclosing sand bank*	*House 700 construction*	*House 700 floor*	*House 500 construction*	*House 500 Stage I floor*	*Structure 353 (N room House 500)*
Undiagnostic	6	17	160	46	27	122	128	48
Smithing-hearth bottoms			1156					
Vitrified hearth lining		23						

Slag type	Phase 5			Phase 6	Phase 7	Phase 8	Phase 9	Phases 2–7
	House 500 Stage II construction	*Pathway*	*Abandonment layers*	*Shed 400 fills*	*Outhouse 006 floor*	*Eavesdrip gully*	*Hut 026 floor*	*Midden (NE and E)*
Undiagnostic	20	29	31	9	3	8	3	222
Smithing-hearth bottoms		146		285				672
Vitrified hearth lining								24

linings derive from smithing hearths rather than from smelting furnaces.

Hammerscale

The most diagnostic debris produced by iron-smithing is hammerscale. This occurs in two forms: plate (<1mm thick, 2–4mm long and wide) which resembles fish scales, and spheres (<3mm dia.). Both types of hammerscale are dark grey in colour and magnetic. Plate hammerscale forms as a result of the oxidation of the surface of iron as it is heated by the smith. Spherical hammerscale is thought to form primarily during the welding of iron.

The flots and residues retrieved during the processing of the environmental soil samples were examined to check for the presence of hammerscale. No soil samples were collected specifically to recover hammerscale. The distribution of hammerscale in house floors is shown in Figures 5.27, 6.64–6.65, 9.56, 10.37–10.38 and 11.26.

Chronological distribution of debris

The iron-smithing slags are most abundant in contexts from phases 2–5 (Table 17.2). It is possible that slags in contexts from later phases are residual.

Spatial distribution of debris

Table 17.3 shows the spatial distribution of the debris. Most of the ironworking debris was recovered from the northeastern midden, House 500 Stage I and the enclosing sand bank. Many more small pieces of ironworking slag as well as iron debris were also retrieved from the heavy residues after flotation of samples; these were not submitted for identification. The distribution in the house floors of this iron debris and ironworking slag >10mm and <10mm retrieved during the sampling programme is shown in Figures 5.6, 5.8, 6.18, 6.21, 6.23, 6.25, 7.9, 9.19, 10.13, 10.15, 11.11–11.12.

Conclusions

The slags from Cille Pheadair provide evidence for small-scale iron-smithing activities. There is no evidence for the smelting of iron or for the working of other metals. This activity is likely to have occurred in the vicinity of the northeastern midden, outside House 500 and the enclosing sand bank during phases 2–5. The small quantities of iron-smithing slag are compatible with the occasional repair (and perhaps manufacture) of artefacts to meet the needs of the immediate community.

Table 17.4. Catalogue of iron-smithing debris recorded as small finds

SF no.	Context	Area	Phase	Type	No.	Weight (g)	Comments
1082	308	Northeastern midden	5	ND	1	2	
1089	307	Northeastern midden	5	ND	1	7	
1133	319	Northeastern midden	3	ND	1	3	
1135	319	Northeastern midden	3	ND	1	13	
1137	319	Northeastern midden	3	ND	1	0.5	
1197	328	Northeastern midden	3	ND	1	7	
1215	332	Northeastern midden	2	ND	1	16	
1251	001	Surface cleaning layer	U/S	ND	1	1	
1256	339	Northeastern midden	2	ND	1	5	
1257	339	Northeastern midden	2	ND	1	9	
1261	340	Northeastern midden	3	SHB	1	541	120 × 120 × 80mm
1437	356	Structure 353 (N room of House 500)	4	ND	1	5	
1444	358	Structure 353 (N room of House 500)	4	ND	1	22	
1486	367	Shed 400 fill	6	SHB	1	285	90 × 70 × 55mm
1490	370	House 500 (north room)	4	ND	1	4	
1501	367	Shed 400 fill	6	ND	1	6	
1506	352	House 500 stage II (north room)	5	ND	1	3	
1509	358	Structure 353 (N room of House 500)	4	ND	2	7	
1607	384	Construction fill	4	ND	2	4	
1628	308	Northeastern midden	5	ND	1	2	
1633	308	Northeastern midden	5	ND	1	32	
1634	308	Northeastern midden	5	ND	1	3	
1636	308	Northeastern midden	5	ND	1	9	
1637	308	Northeastern midden	5	ND	1	7	
1643	308	Northeastern midden	5	ND	1	2	
1645	308	Northeastern midden	5	ND	1	3	
1651	308	Northeastern midden	5	ND	1	1	
1704	313	Abandonment layer	5	ND	1	9	
1725	319	Northeastern midden	3	SHB	1	131	(part)
1737	319	Northeastern midden	3	ND	1	3	
1742	319	Northeastern midden	3	ND	1	15	
1743	319	Northeastern midden	3	ND	1	2	
1757	430	Eastern midden	4	VHL	1	24	
1763	507	House 500 stage II abandonment fill	5	ND	1	2	
1797	533	House 500 stage II wall core	5	ND	1	6	
1798	534	House 500 stage II pathway	5	ND	1	15	
1837	319	Northeastern midden	3	ND	1	23	
1903	534	House 500 stage II pathway	5	SHB	1	146	90 × 60 × 35mm
1912	533	House 500 stage II wall core	5	ND	1	3	
1934	533	House 500 stage II wall core	5	ND	1	1	
1967	457	Midden on top of sandbank enclosure	2	SHB	1	1156	140 × 110 × 70mm

Table 17.4. continued

2032	472	Eastern midden	3	ND	1	3	
2034	556	House 500 floor	4	ND	1	39	
2039	556	House 500 floor	4	ND	1	3	
2056	553	House 500 construction	4	ND	1	12	
2057	553	House 500 construction	4	ND	3	1	
2059	553	House 500 construction	4	ND	1	4	
2065	553	House 500 construction	4	ND	1	9	
2075	600	Peat ash surface	2	ND	1	4	
2138	569	House 500 construction	4	ND	1	28	
2139	569	House 500 construction	4	ND	1	10	
2140	569	House 500 construction	4	ND	1	23	
2148	569	House 500 construction	4	ND	1	31	
2210	534	House 500 stage II pathway	5	ND	3	8	
2211	U/S		U/S	ND	1	5	
2212	459	House 700 wall cut fill	3	ND	2	17	
2213	618	Levelling layer	2	ND	1	9	
2214	459	House 700 wall cut fill	3	ND	4	6	
2215	453	Midden on top of sandbank enclosure	2	ND	4	147	
2216	701	House 700 floor	3	ND	1	22	
2217	556	House 500 floor	4	ND	2	58	
2218	582	Fill layer	2	ND	1	3	
2219	544	House 500 floor	4	ND	1	27	
2220	607	Pit complex	1	ND	1	5	
2221	533	House 500 stage II wall core	5	ND	2	3	
2222	459	House 700 wall cut fill	3	ND	1	4	
2235	534	House 500 stage II pathway	5	ND	1	1	
2274	701	House 700 floor	3	ND	1	3	
2301	459	House 700 wall cut fill	3	ND	1	2	
2304	582	Fill layer	2	VHL	1	23	
2384	335	Northeastern midden	3	ND	1	8	
2388	U/S		U/S	ND	2	35	
2396	317	Northeastern midden	4	ND	1	10	
2397	317	Northeastern midden	4	ND	1	5	
2422	367	Shed 400 fill	6	ND	2	3	
2423	528	Sandbank extension	3	ND	1	9	
2432	533	House 500 stage II wall core	5	ND	1	7	
2435	313	Abandonment layer	5	ND	1	3	
2443	009	Northeastern midden	7	ND	1	2	
2444	405	Make-up layer of House 500	2	ND	1	1	
2448	317	Northeastern midden	4	ND	1	10	
2453	397	House 500 stage II pathway	5	ND	1	5	
2463	308	Northeastern midden	5	ND	1	3	

Table 17.4. continued

2473	313	Abandonment layer	5	ND	1	4	
2493	332	Midden on top of sandbank enclosure	2	ND	1	4	
2495	351	Abandonment layer	5	ND	1	2	
2496	105	House 007 eavesdrip gully	8	ND	1	0.5	
2498	060	Outhouse 006 floor	7	ND	1	3	
2499	070	Hut 026 floor	9	ND	1	3	
2500	328	Northeastern midden	3	ND	1	2	
2501	323	Sandbank enclosure	1	ND	1	1	
2502	091	House 007 floor	8	ND	1	1	
2503	091	House 007 floor	8	ND	1	2	
2509	328	Northeastern midden	3	ND	1	4	
2585	459	House 700 wall cut fill	3	ND	1	17	
2647	366	Structure 353 (N room of House 500)	4	ND	1	7	
2649	555	House 500 hearth	4	ND	1	1	
2651	701	House 700 floor	3	ND	1	2	
2762	324	Northeastern midden	3	ND	1	10	
2763	023	Abandonment layer	5	ND	1	11	
6926	115	House 007 eavesdrip gully	8	ND	1	4	

SHB = smithing-hearth bottom, VHL = vitrified hearth lining, ND = non-diagnostic ironworking slag

Table 17.5. Fuel ash slag recorded as small finds by phase and context

Phase	Context	SF no.	Area	Weight (g)
1	321	1145	Within sandbank enclosure	
2	354	2537	Within sandbank enclosure	
4	370	1484	Structure 353 (north room)	5
4	544	2650	House 500 floor	
5	308	1631	Northeastern midden	27
5	308	2539	Northeastern midden	
7	205	2648	House 312 hearth	
7	035	2767	Northwestern midden	

17.2 Fuel ash slag

D. Dungworth, M. Parker Pearson and H. Smith

Fuel ash slag is a very lightweight, light coloured (grey-brown), highly porous material which results from the reaction between alkaline fuel ash and silicates from soil, sand or clay at elevated temperatures. The reaction is shared by many pyrotechnological processes and the slag is not diagnostic of any metalworking process.

Eight large pieces of fuel ash slag were hand-collected as small finds, distributed in contexts spanning phases 1 to 7. Three pieces came from house floors or hearths, and three from midden layers (Table 17.5). This slag might well have been formed through domestic, hearth-based pyrotechnological activities. Many small pieces of fuel ash slag were also retrieved from the heavy residues after flotation of samples; these were not submitted for identification. The distribution in the house floors of this fuel ash slag >10mm and <10mm is shown in Figures 5.6, 6.18, 6.21, 6.23, 6.25, 7.8, 9.17, 10.15 and 11.11.

18 The faunal remains – mammals

J. Mulville, A. Powell, J. Williams, C. Ingrem and J.R. Jones

18.1 The large mammals

J. Mulville and A. Powell

Methods

The majority of the faunal assemblage from Cille Pheadair was recorded and reported on by Cori Kaplan (Kaplan 1999), Rachel Lloyd (Lloyd 1999) and Mark Ward (Ward 1999) under the supervision of Paul Halstead at the University of Sheffield for their MSc dissertations in 1999. Smaller amounts were subsequently recorded by Rich Madgwick and Adrienne Powell at Cardiff University. The individual bone records were then combined, rephased, reanalyzed and reported upon by Jacqui Mulville and Adrienne Powell.

Species identification

The animal material was identified using the reference collections housed at the Department of Archaeology, University of Sheffield and the School of History, Archaeology and Religion, Cardiff University. For differentiating between sheep and goat, the methods described by Payne (1985) were applied to the mandibular teeth of young caprines, and Boessneck (1969) was used for the post-cranial osteological variations. Both these methods were applied to *in situ* mandibular third deciduous premolars (dP_3), *in situ* and loose fourth deciduous premolars (dP_4), and to the atlas, scapula, humerus, radius, ulna, pelvis, femur, tibia, astragalus, calcaneum, metacarpal and metatarsal, and first, second and third phalanges.

Where bones could not be assigned to either sheep or goat, they were recorded as sheep/goat. No goat was identified by the Cardiff University team, and subsequent attempts to relocate those elements in the assemblage identified as goat by the MSc students has failed. Thus whilst goat may be present – it is identified at one or two other Scottish sites in very small numbers – a degree of caution in interpreting these results may be appropriate.

Non-diagnostic red deer-size and cattle-size fragments were recorded as cow/red deer. Similarly, non-diagnostic fragments of the smaller artiodactyls were recorded as sheep/goat/roe deer.

Quantification

The following anatomical units were recorded:

- horn core (base or tip),
- antler (all fragments, though only tine tip and pedicle/coronet were counted),
- occipital condyle,
- premaxilla,
- zygomatic arch,
- mandibles (with three or more molar or premolar teeth present),
- loose mandibular teeth (cattle/sheep/goat/pig dP_4 and M_3),
- pig mandibular and maxillary canines,
- hyoid,
- atlas,
- axis,
- sacrum,
- patella,
- scapula (with 50% of the articular area remaining),
- pelvis (acetabular region),
- astragalus, calcaneum, navicular cuboid and magnum; other carpals and tarsals were ignored,
- phalanges, with the exception of pig lateral phalanges,
- all major long bones were recorded by dividing them into proximal and distal halves. Only the proximal ulna was recorded given its robust qualities and the fragile nature of the distal half.

Numbers of unidentifiable burnt bone fragments, rib articulations and vertebral centra were also noted but not recorded for analysis, the ribs and vertebrae being identified to cattle-, sheep- or hare/fox-size categories only. All cetacean and seal material was recorded and kept separately for future specialist analyses.

For each recorded anatomical unit the following

variables were noted where appropriate: context and environmental sample number, anatomical unit, taxon, state of fusion/eruption/wear, side of body (left or right), degree of fragmentation, evidence of burning and/or gnawing, presence and location of cut-marks, sex and pathology.

Quantification was carried out as closely as possible in consistency with the recording systems of other Hebridean assemblages: Baleshare and Hornish Point (Halstead 2003), Cill Donnain (Vickers 2014), Dun Vulan (Mulville 1999) and Bornais (Mulville 2005; Mulville and Powell 2012; forthcoming). A major component of these analyses is the use of minimum numbers of particular elements. This increases the amount of information for species identification, age, sex, size, pathology and butchery whilst reducing the time and expense required for analysis (Mulville 1999: 235).

However, differences occur between ul Haq (1989) and Mulville (1999; 2005), and Halstead (1985). The former two authors both use a method of minimum number of elements (MNE) whereas Halstead (1985) generally uses minimum number of anatomical units identified to species (MinAU). In the analysis of Cille Pheadair, Halstead's MinAU method of recording has been adapted to provide MNE data. Thus the methods of reporting used here vary slightly compared to those of more recently excavated sites on the Western Isles (*e.g.* Bornais 2005, 2012 and forthcoming, Cill Donnain 2014 and Cladh Hallan in preparation) but the results are broadly comparable.

Halstead's method differs in that all fragments are counted unless they can be proven to be part of another bone. For the analysis of the Cille Pheadair faunal assemblage, if two or more fragments appeared to derive from the same element, they were recorded but only the most complete fragments contribute to the MinAU. Fresh breaks were glued where matching pieces of elements were present. Elements with fresh breaks but with no matching counterparts were included and noted as freshly broken. Material for identification was strewn according to the initial phasing and, although all fragments were recorded and appear in the archive, only those considered to be non-repeating elements (*i.e.* representing different individual bones/teeth) were included in the quantification. Thus the MinAU has been incorporated into the methodology from the initial stages.

The disadvantage of this method is that it does not allow for re-phasing of material in later post-excavation stages. When subsequent information on phasing became available, a small number of contexts moved from one phase to another; thus the MinAU may no longer be completely accurate. It was decided, however, that as such a small number of fragments were involved that the data-set would be used without reviewing the MinAU decisions.

The NISP was initially calculated and from this the MNE and then it was possible to calculate the MNI (minimum number of individuals). The MNI is the quantitative unit accounting for the number of individual faunal remains constituting all the skeletal elements of a species (Lyman 1994: 100). The percentage survival of each element was calculated according to Brain (1981) for the major species, where the number of each element present is expressed as a percentage of the most frequently occurring unit, therefore expressing the expected survival of the units according to the most numerous unit.

Ageing

Dental eruption and wear were recorded for mandibles and isolated mandibular teeth (dP_4 and M_3) using the methods of Payne (1973) and Deniz and Payne (1982) for sheep/goat, and Halstead's (1985) reworking of Payne (1973) for cattle. The method suggested by Grant (1975; 1982) was used for recording pig teeth and the results are grouped following O'Connor (1988). The fusion stage of post-cranial bones was recorded and related age ranges were taken from Getty (1975).

Measurements

Measurements on bones from terrestrial mammals were taken following von den Driesch (1976), Davis (1992) and Payne (1973), and following Ericson and Storå (1999) for seal bones. These are held in the site archive but not analysed for this report.

Taphonomy

Preservation was recorded as gnawed, digested, burnt, gnawed and burnt, and rodent-gnawed. The general gnawing category implies modification by dogs and other carnivores, but may also include human activity. Fragmentation was recorded for each specimen. The categories are: complete, some shaft missing, end and shaft, end splinter, shaft splinter, cylinder, end only, shaft and end splinter, new break and irrelevant. Specimens other than long bones (tibia, humerus, femur *etc*.) or small bones (phalanges, metapodia, tarsals or carpals) usually fell into the irrelevant category. Butchery was recorded according to the categories described by Binford (1981): uncut, chopped, dismembering, filleting, skinning and other. Worked bone and antler artefacts are covered in detail in Chapters 13 and 14.

Sexing

Sexing was carried out using the pelves of cattle (Grigson 1982), sheep and goats (Boessneck 1969), and the upper and lower canines of pigs.

Recovery

Bone was recovered initially by hand-picking followed by either dry-sieving or flotation of all deposits through a 10mm mesh. As described in earlier chapters, selected contexts were processed by flotation and numerous bulk samples were taken across the site. The samples were

Table 18.1. Distribution of mammal bone at Cille Pheadair by phase

Phase	Cattle	Sheep	Sheep/Goat	Goat	Pig	Horse	Dog	Cat	Red Deer	Roe Deer	Otter	Pine marten	Hare	Rabbit	Cetacean	Common seal	Grey seal	Seal	Cattle size	Sheep size	Hare/fox size	Total
1	60	19	86		34	1	1	1	6	2	1						1	2	8	11		**233**
2	141	18	217	1	70			2	15	4		1			9			23	4	8		**513**
3	180	37	237	6	82	2	5	2	7	3	2			1				4	8	11		**587**
4	404	76	674	3	185	8	5	15	31	12	2							3	17	10	6	**1451**
5	828	233	830	13	176	28	11	6	49	2			4	2	1			13	48	32	5	**2281**
6	366	86	431		46	12	5	2	22									1	6	2		**979**
7	577	230	775	4	96	7	7	2	45						3				84	47		**1877**
8	136	58	199		34	6	1	2	17						2	1			22	37	1	**516**
9	83	75	119		16	1	1	2	16	1					2	1	1	3	16	24		**361**
Total	**2775**	**832**	**3568**	**27**	**739**	**65**	**36**	**34**	**208**	**24**	**5**	**1**	**4**	**3**	**17**	**2**	**2**	**49**	**213**	**182**	**12**	**8798**

whole earth and, to standardize recovery, the heavy residues produced by the flotation programme were sieved through a 7.5mm sieve and retrieved bone was re-incorporated into each context. The mammalian bone remaining in the residues has not been examined.

Comparisons

The Cille Pheadair data has been compared to a number of sites in the Western Isles. The sources of information for these sites, in order of their appearance in the text and in tables, are: Dun Vulan (Mulville 1999), Bornais Mounds 1 and 3 (Mulville 2005; Mulville and Powell 2012) and the Udal (Serjeantson 2013) on the Uists, and Cnip and Bostadh, on Lewis (Thoms 2003).

Results

A total of 8,798 identified fragments was recorded from the site.

Distribution across phases

The distribution of material through the phases is shown in Table 18.1. The largest collections of material come from activities associated with the occupation of House 500 Stage I in phase 4, and its remodelling and use in phase 5, the use of Sheds 406, 400 and 365 in phase 6, and the construction and use of House 312 in phase 7. Each of these phases has around 1,000, or more, fragments of bone.

Distribution across context types

The majority of bone, *c.* 3,600 fragments, was recovered from midden contexts in phases 2 to 7. A variety of sand fill layers across the site contained 1,700 fragments, with the majority of these belonging to phases 5, 6 and 7. Floor layers produced *c.* 800 fragments, mostly from phases 4, 6, 7 and 9. All other context types produced more than 100 fragments.

Taphonomy

Evidence for taphonomic modification to identified bone fragments is shown in Tables 18.2 and 18.3. Very little of the identifiable bone was burnt, only 3% of the bone overall, with values ranging from 1% to 5% in individual phases. The highest levels are in phase 8 and the lowest in phases 2 and 3.The percentage of burnt bone in each context type for each phase was also calculated. Only very small contexts in phases 1, 8 and 9 contained more than 10% burnt bone, suggesting that burnt bone was not common at any time in any particular context type. Whilst bone may be burnt during cooking, the majority of burnt bone reflects either bone disposal, or the use of bone as a fuel (particularly cetacean bone) or accidental incidents. The level of burning at other Hebridean sites, such as contemporaneous Norse-period Bornais and Middle Iron Age Dun Vulan, was also recorded at 2%; the low levels found at these sites suggest that in general bone was not deliberately burnt.

Overall 2,011 specimens of gnawed bone were recorded, 23% of recorded material, of which 99% are examples of carnivore gnawing, primarily by dogs but some of

Table 18.2. Bone modification by phase

Phase	Burnt	%	Gnawed	%	Butchered	%
1	8	3	65	28	17	7
2	6	1	121	25	21	5
3	7	1	144	24	40	6
4	49	3	382	26	50	3
5	48	2	508	23	142	6
6	26	3	177	18	32	3
7	53	3	416	22	122	6
8	27	5	114	22	39	8
9	13	4	84	23	44	12
Total	237	3	2011	23	507	6

the toothmarks are small enough to suggest cats as the destructive agents. The remaining gnawed specimens exhibit rodent gnawmarks. In individual phases, the percentage of gnawed bone ranges from 18% to 28%, with the lowest levels found in phase 6, and the highest in phase 1 (Table 18.2). Comparison with Dun Vulan (14% gnawed) and Norse-period Bornais (Mound 3; 16% gnawed) suggests that the level of gnawing at Cille Pheadair is slightly higher. This is not merely a product of a higher population of dogs at this site; indeed, dogs make up 2% of the NISP assemblage at Bornais but less than 1% at Cille Pheadair. There is, however, copious evidence for canid, and indeed felid, activity at Cille Pheadair, in the form of coprolites found within the houses, middens and other deposits. Thus, whilst the number of skeletal elements of dogs may be lower than at other similar sites, the level to which these dogs (and cats) impacted upon the community appears to be much higher.

Gnawing occurs during 'rubbish' management and often reflects the taphonomy of individual contexts. Material that is not swiftly removed from open areas is likely to become gnawed; thus, in the presence of dogs, lower levels of gnawing suggest organized and relatively swift disposal of animal bones. Floor layers, for example, could be predicted to have higher gnawing levels than pits. Of course, secondary deposition into any feature, such as a midden or even a pit, may include previously exposed material. The overall percentage in each phase reflects which types of context are present in that phase; thus phases with a higher proportion of material deriving from floor contexts can be predicted to contain more gnawed bone.

Across the assemblage as a whole this predicted pattern is observed: 29% of the bone from floor layers was gnawed, compared with 22% of bone from midden layers. This difference in gnawing intensity supports the suggestion that dogs interact with bones more frequently within the domestic sphere, and that suggestion is reinforced by the prevalence at Cille Pheadair of other indicators of canid activity. Secondly, this pattern of gnawed bone indicates that, overall, material in the middens does not derive exclusively from clearing out the house and from floor layers, but that bone derived from other activities was also incorporated into the middens.

There is, however, a degree of variation across the different phases in the incidence of gnawing, and this relates both to the type of context, and ultimately what activities were occurring at that time. Table 18.3 demonstrates this by calculating the percentage of gnawed bone in each of the contexts/context groups that contains more than 100 fragments. Unfortunately most floors, and the entirety of phase 1 and phase 8, have insufficient material to be included.

- In phase 2, the midden (where 22% of bone has been gnawed) contains less gnawed material than sand fills (24%).
- In phase 3, when the first stone-walled longhouse, House 700, is built and occupied, the midden deposits are more damaged (25%), and are unlikely to comprise material of similar origin to that found within the sand bank (20%).
- Phase 4, when House 500 is in use, has low levels of gnawing in the midden layers (21%), sand layers between the floors (23%) and sand fill layers (25%), with more gnawing present in the floor (36%).
- By phase 5, the material in the sand fills becomes highly gnawed (25%) compared with that in the middens (22%).
- The individual context types in phase 6, when the sheds were constructed, all have slightly less evidence for canid activity. There is between 17% and 20% gnawing in sand fill, floors and midden layers and the lowest proportion of gnawed bone for the site as a whole is associated with the cobbled working platform or stack-base (14%).
- With the construction of a new longhouse and outhouse in phase 7, the level of gnawing increases slightly, with 27% gnawing in the floor, 21% to 22% in the make-up, sand fill and midden layers, whilst the windblown sand layers, interpreted as forming during periods without permanent occupation, have a slightly lower proportion at 19%.
- In phase 9 both the floors of the huts and the windblown sand fill have high levels of gnawing (24% and 23% respectively).

Butchery marks were recorded on 6% of bone (Table 18.2), and in the various phases this figure mostly ranges between 3% and 8%, with a much higher level observed in the small phase 9 assemblage (12%).

Species

There are 15 species present (Table 18.1): the domestic mammals are horse, cattle, sheep, goat, pig, dog and cat. Terrestrial wild mammals are represented by red deer, roe deer, otter, pine marten, hare and rabbit. The recorded marine mammals are common seal and grey seal; remains from small and large cetaceans are also present but are not identified to species for this report.

Table 18.3. Canid-gnawed bone at Cille Pheadair by phase and major context groups

Phase	Context type	Total	Burnt	% Burnt	Gnawed	% Gnawed
2	Midden layer	279	3	1	62	22
	Sand fill	104	3	3	25	24
	Sand layer	101	0	0.0	27	27
3	Midden layer	225	1	0	57	25
	Sandbank extension	133	3	2	26	20
4	Floor	360	15	4	129	36
	Midden layer	656	23	4	141	21
	Sand fill	151	6	4	38	25
	Sand layer between floors	128	3	2	30	23
5	Midden layer	1318	31	2	293	22
	Sand fill	765	13	2	192	25
6	Floor	159	8	5	28	18
	Midden layer	240	6	3	48	20
	Sand fill	323	8	2	55	17
	Stone platform or stack-base	110	1	1	15	14
7	Floor	169	8	5	46	27
	Make-up layer beneath 312	110	2	2	23	21
	Midden layer	911	26	3	189	21
	Sand fill	373	3	1	82	22
	Windblown sand fill	159	10	6	31	19
9	Floor	122	0	0	29	24
	Windblown sand fill	154	0	0	36	23

Whilst both sheep and goat have been identified, goat is much less frequent and makes up only 3% of the ovicaprid remains identified to species, whilst sheep account for the remaining 97%. Thus the majority of the ovicaprid remains that could not be speciated will belong to sheep rather than to goat. The term sheep/goat will be used for all sheep, sheep/goat and goat remains within the discussion, although separate mention will be made of the occurrence of goat throughout the periods.

Phase descriptions

Phase 1

This phase, comprising ploughsoil, cut features and a possible structure, produced 233 identified fragments of bone. This small sample is dominated by sheep/goat, with cattle and pig *c.* two-thirds and one-third as frequent, respectively. There are single instances of horse, dog and cat: a horse proximal metatarsal, dog metapodial and a cat unfused tibia. Red deer (*Cervus elaphus*) are represented by antler, a scapula, two humeri, a magnum and a pelvic fragment, and roe deer (*Capreolus capreolus*) by a humerus and a femur; these are prime meat bones, indicating the use of these animals for food. Otter (*Lutra lutra*) is represented by a single specimen of scapula, unbutchered, and seal by a mandible (identified to grey seal, *Halichoerus grypus*), a first phalanx and a second phalanx.

Phase 2

Phase 2 is made up of a series of layers, features and possible floors and produced 513 identified fragments of bone. The predominant species was sheep/goat, *c.* 200 fragments, followed by cattle and pig. Other domestic species include a single goat mandible and a cat ulna and femur, both fused. Wild species are represented by a number of red deer antler fragments, along with four upper limb bones, a calcaneum and phalanges, a few roe deer upper forelimb bones, a lumbar vertebra from a pine marten (*Martes martes*) and a group of seal bones from context 573, comprising mainly rear flipper elements but including a maxillary fragment, two ribs and a lumbar vertebra.

Phase 3

Phase 3 sees the establishment of House 700 and the creation of middens. Containing 587 fragments, this is an assemblage of similar size to that of phase 2 and the relative abundance of the domestic species in this phase reflects the previous two phases. The assemblage is again dominated by sheep/goat followed by cattle and pig; cattle is slightly greater in frequency than in the earlier phases. As in the

previous phases, goat is identified from a small number of elements, here the horncore, mandible, scapula and radius. Other domestic species include horse, represented by a scapula and humerus, and further evidence of dog (three mandible fragments and a pelvis), and cat (an adult mandible and a tibia). Wild species are again present, with small numbers of red deer limb bones and antler fragments, as well as a few roe deer forelimb bones and an otter pelvis and calcaneum. Marine mammals are represented by a seal tooth, seal mandible and two phalanges.

Phase 4

The larger phase 4 assemblage (NISP = 1,451) derives from activity associated with the construction and use of the large House 500 and its attached north room. This assemblage contains a wider range of species, with an increase in the proportion of sheep/goat, and a corresponding decrease in cattle and pig numbers. Goat was identified from a mandible and loose teeth.

A number of cat bones, atypically outnumbering dog bones, were recorded, with atlas, limb bones and metapodia present; all except one of the 15 specimens were recovered from midden context 317. Two of these bones, a right and a left ulna, appear to be a pair and it is possible that the remaining elements from this context could also have come from the same animal. The few dog specimens present are all hindlimb elements. Amongst the eight specimens of horse, a fragment of skull and two femur fragments were within the house, with an atlas and axis vertebrae – the latter gnawed – recovered from the midden.

For red deer, almost as many ‘non-counted’ antler fragments, the majority of which came from the midden contexts, were recovered as other recorded elements, indicating the importance of antler as worked material. A small amount of antler shows evidence of unfinished working, with tool-marks present. The remainder of the red deer bone, which includes skull fragments, mandibular fragments, a loose tooth and limb bones (humerus and tibia), were more or less evenly distributed between the house and middens, although the latter have a higher frequency of elements (phalanges, metacarpals, mandible) typical of primary butchery waste. Roe deer is again only represented by limb bones (eight femur fragments, a single humerus and three radius fragments). Again, most of this material is derived from the occupation layers within the house.

Otter is represented by two specimens: a sacrum and an ulna with midshaft cut-marks consistent with skinning.

Phase 5

Phase 5 relates to the remodelling of House 500 and its north room to create a smaller house and a free-standing outhouse. This phase of occupation yielded the largest assemblage (NISP = 2,281). The changes seen in cattle and sheep/goat proportions for phase 4 are reversed: the proportion of sheep/goat fragments declines whilst that of cattle increases markedly. The proportion of pig continues to decline from 14% to 8%. The proportion of goat remains constant; the majority were recovered from within the house, and only four of the 13 fragments derive from the midden. Horncore, forelimb and mostly hock joint elements were recorded.

All of the cat specimens, fore and hindlimb bones, were within the midden, as were the majority of the dog bones. A range of dog elements was recorded: a humerus, an ulna, a pelvis, two femur fragments, three astragali and a calcaneum were found in the middens, with another humerus and femur fragment in the abandonment layer (351).

The frequency of horse bones, although still low, doubles in this phase, from 0.6% of total identified bone in phase 4 to 1.2%. A number of fragments of horse mandible are present, along with humerus, radius and femur fragments, with bones of the tarsal joint, metapodia and a second phalanx. The majority of horse bone was recovered from the midden, although all of the mandible fragments, along with a metacarpal, were recovered from the house floors. The house forecourt contained only metapodia fragments and a neonatal calcaneum.

Red deer also increase in relative abundance, with the majority of red deer bone found in the midden. The most abundant elements are antler, tibia and metapodials. Almost all of the antler fragments show some form of modification related to antler-working, and the prevalence of tibia and metapodials may also be related to bone-working. Other red deer elements derive from both the upper and mid-limb bones, and a single phalanx was recorded. Roe deer is represented by a femur from within the house and a metatarsal in the midden.

Hare is recorded in this phase – the only occurrence in the assemblage – with a single femur and three tibia recovered from the midden: these longbones probably indicate food waste.

Seal bones are equally distributed between house and midden layers. A tooth and fore and hindlimb elements are present, in addition to a few phalanges.

Phase 6

The smaller assemblage associated with the sheds and middens of phase 6 (NISP = 979) reverses the rise in the representation of cattle fragments shown in the previous phase; sheep/goat fragments increase their numerical dominance and pig slightly decreases from 8% to 5%. No goat was identified in this phase. Horse bones are dominated by metapodial fragments; other material present comprises a fragment of humerus, radius, ulna and two fragments of tibia. Dog is represented by a mandibular fragment, a scapula and three fragments of limb bones, and cat by two mandibles. The majority of this material was found within the sheds.

Red deer are represented by antler, and a range of material from the head, upper and lower limbs, although metapodials predominate. Most of the antler fragments show evidence of working. No roe deer is present. A single seal tooth was recovered.

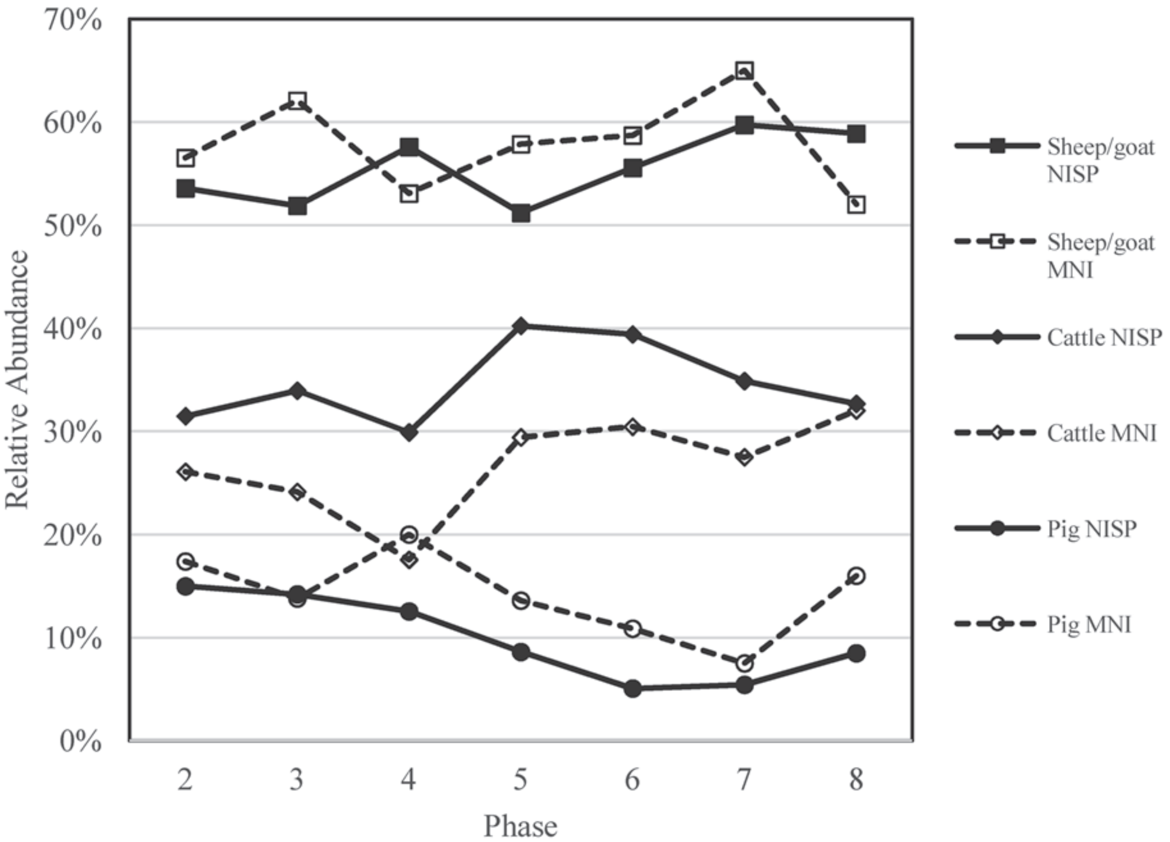

Figure 18.1. Relative abundance of species by NISP (solid line) and MNI (dotted line) at Cille Pheadair

Phase 7

Another sequence of construction, occupation and abandonment of a house (House 312) and outhouse commences in phase 7. A large quantity of material (NISP = 1,877) is associated with a sequence of house floors, middens, and construction and abandonment deposits. This phase continues the trend for increasing sheep/goat representation and a corresponding decrease in cattle fragments whilst pig maintains its low representation. A goat mandible and two pelves were recorded. Horse, save for a fragment of tibia, is represented solely by metapodials and phalanges, all recovered from midden contexts. Dog is represented by humerus and femur fragments, and a single first phalanx, almost all from the midden. Two specimens of cat, a juvenile mandible and an ulna, were recovered from house contexts.

Red deer remains were recovered from both House 312 and associated midden contexts: antler fragments, mandibles, upper and lower limb bone fragments are present.

Phase 8

The construction and use of the next longhouse (House 007) and remodelling of the outhouse in phase 8 generated a small assemblage, with a NISP of only 516. The small size of the assemblage is linked to the lack of midden deposits in this phase. Sheep/goat is still predominant, followed by cattle but the numbers of pig fragments rise slightly in comparison.

A small amount of horse bone was recovered in house deposits. Two femur fragments and a first phalanx were recorded from cuts for the walls of House 007 and another first phalanx and a lower molar from floor deposits of the same house; a scapula was recovered from Outhouse 006. A single lower dog tooth was recovered from a gully and two cat tibias from House 007 fills. Red deer bone is dominated by metapodia, with a few upper fore and hindlimb bones. Worked antler was recovered, as well as antler shavings. Common seal is represented by a maxilla.

Phase 9

The final small assemblage (NISP = 361) derives from hut floors and walls, and may represent reworked material. Sheep/goat are more predominant in this phase, with both cattle and pig decreasing in frequency. Other taxa, apart from red deer, are represented by only a few bones each: a single dog metacarpal, two cat metapodia, a horse navicular, common seal scapula, grey seal zygomatic, seal sp. occipital condyle, mandible and pelvis and a single roe deer tibia. A range of red deer specimens from all parts of the body are present, primarily lower limb bones.

Relative abundance of domestic species

Two phases at Cille Pheadair produced assemblages that fall outside or very near the recommended minima for analysis of a total of 300 NISP (Hambleton 1999): phases 1 and 9. All other phases can be included in a comparison

of the changing proportions of domestic species over time. Figure 18.1 shows that the relative abundance of the species remains relatively constant over time (solid lines are NISP). Sheep/goat (hereafter discussed as sheep apart from in the species-specific discussions) values are maintained at between 52% and 60%, cattle between 30% and 40%, and pigs between 5% and 16%. Sheep increase very slightly in importance over time, with a corresponding decrease in pigs. Cattle are more numerous in phases 5 and 6 but their NISP decreases again in phase 7.

The minimum number of elements (MNE) and the minimum number of individuals (MNI) were calculated. Figure 18.1 (dotted lines) compares the change in relative abundance calculated from the MNI with that calculated from NISP. Overall, the pattern remains similar, with sheep dominating in all phases, fewer cattle, and a small number of pigs. Using the MNI calculation, sheep become slightly more numerous, making up between 52% and 65%; cattle are less numerous at 18% to 32%, whilst the proportion of pig become mores variable, ranging between 8% and 20%. Overall pigs are more common employing the MNI calculation than they are using the NISP and, in particular, there is a large increase in the number of pigs in phase 4. The only other major difference between the two quantification methods is in phase 8, which has a sharp decline in the relative abundance of sheep and a corresponding increase in the importance of cattle.

It is interesting to compare the number of bones per individual animal across the phases and the species. Overall there are more bones per animal present in phase 4 and fewer in phases 7 and 8 although, overall, the numbers are fairly constant at 16. If the NISP is divided by MNI per species, cattle have the most fragments per individual and pig the least. Over time, there is an increase in the numbers of fragments per individual from phases 1–2 to phases 3 or 4, and then this number decreases.

Relative abundance of body parts

After calculating the MNE for each element, the total number of lefts and rights for any one element are represented as a proportion of the expected number of that elements derived from the MNI. The result for each species by phase has been represented graphically, with results displayed in anatomical order, running from the head and neck, through the front and then hindlimb and feet (Figures 18.2–18.4). Visualizing the data this way allows a comparison of which parts of each species are predominant in each phase. Where the minimum number of elements (MNE) is less than 100, the data support only tentative conclusions.

For the discussion of individual species, the data are grouped with all contexts in each phase combined to provide a general overview of the site. These groupings are as follows: phases 1 and 2, prior to the establishment of House 700, phases 3 to 5 relating to Houses 700 and 500 and subsequent remodelling, and phases 6 to 9 associated with the creation of Houses 312 and 007, and the final huts.

The discussion of patterning within body part representation refers to various groups of elements which are defined here:

- Head elements comprise the horn core, occipital condyle, premaxilla, zygomatic and mandible.
- The neck is represented by the atlas and axis.
- The key meat-bearing limb elements are the upper forelimb (scapula, humerus, upper radius and ulna) and lower spine/upper hindlimb (sacrum/pelvis, femur and upper tibia).
- The lower forelimb (lower radius/ulna, metacarpal, metatarsal and phalanx) and lower hindlimb (lower tibia, calcaneum, astragalus and navicular cuboid – here discussed as the hock) have a lesser meat value in cattle and sheep, but in pigs these can be classed with the upper limb elements.

The head and feet are often the first elements removed after slaughter; the head has a relatively high meat value, for example in the tongue, the brain and the muscles of the cheek, whilst feet are less nutritious. Thus the pattern of distribution of various elements, and groups of elements, will relate both to the importation of material to the site as well as the subsequent fragmentation, destruction and disposal associated with butchery and consumption. The distribution of body parts is affected by preservation, therefore those elements from young animals or of fragile construction are less likely to survive.

SHEEP

Sheep remains are numerous at Cille Pheadair; the greatest number of individuals represented in a single phase is 59 (phase 5) and the minimum seven (phase 1). All phases except the earliest, phase 1, contained over 100 MNE (Figure 18.2). A few general trends can be observed. Overall there is a low number of phalanges present. This is unlikely to be entirely linked to recovery, as the small navicular cuboid and patella (similar in size to the first phalanx) were often recovered, demonstrating that small bones are present. This pattern suggests the presence of both prime and lesser meat bones of the limbs and the head, but few elements of the feet.

Other generally rare elements include the small and dense elements, the astragalus (and the calcaneum after phase 2) as well as parts of the head and the neck. Such a pattern indicates that these deposits do not comprise primary butchery waste, indicating that such waste was disposed of elsewhere, either before or after the importation of animals to the site. The sacrum is also rare, but given the presence of the associated pelvic bones this is likely to relate to processing rather than a genuine absence. A description of each phase for the remaining elements follows.

Phases 1 and 2

In phase 1 (Figure 18.2) bones of the head, upper forelimb (humerus and radius) and the upper hindlimb (femur and tibia) predominate, suggesting a degree of focus on meat-

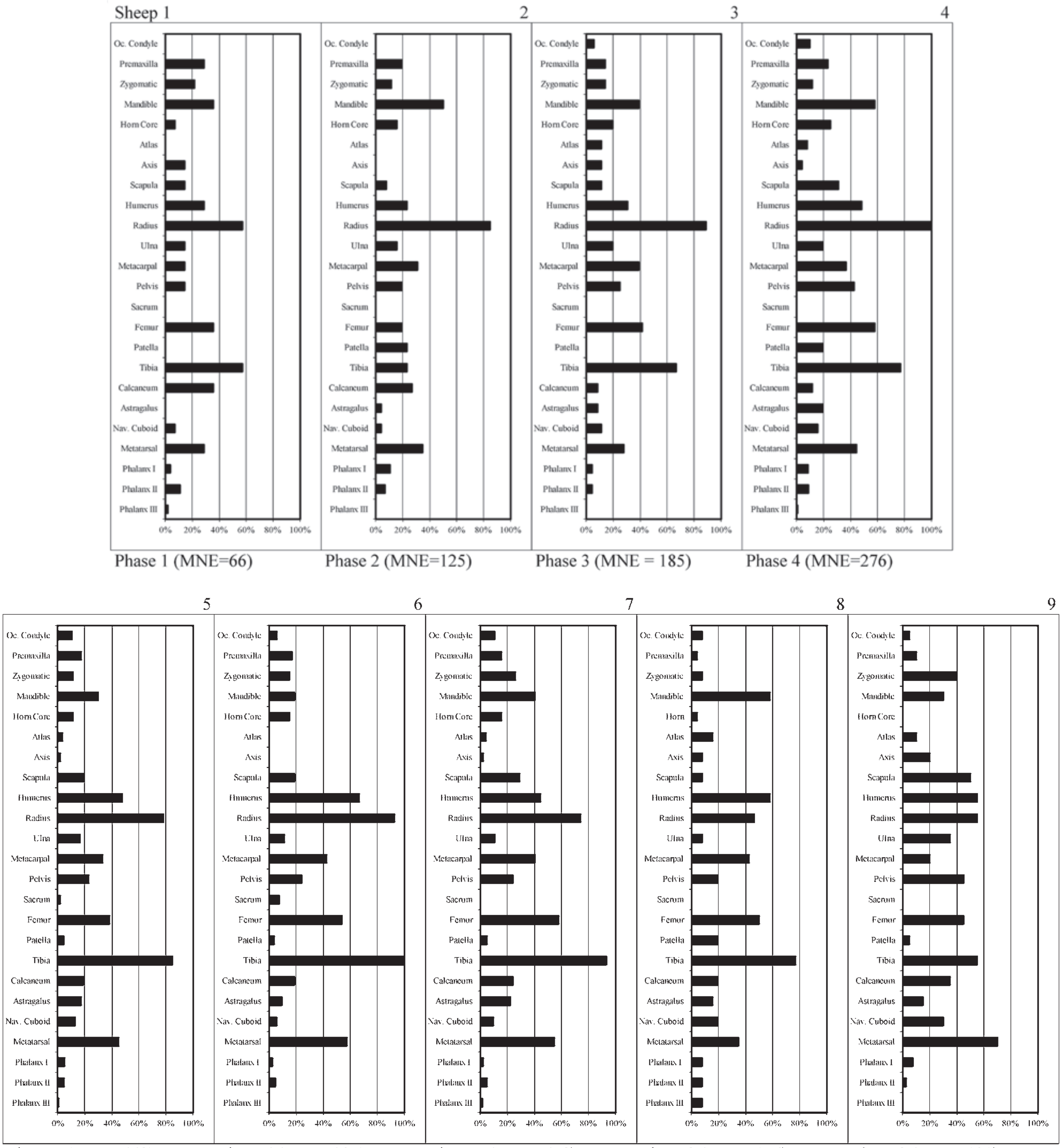

Figure 18.2. Relative abundance of body parts for sheep by phase

bearing bones. In phase 2 a similar pattern is seen, with an overall increase in the proportion of most elements, and in particular in that of mandibles and metapodia.

Phases 3 to 5

Phases 3 to 5 are typified by an increase in the abundance of upper limb elements, indicative of a focus on the deposition of prime meat bones. Metapodia and mandibles are also present in substantial numbers, suggesting the continued exploitation of lesser meat-bearing elements for meat, marrow and/or tool-making.

Phases 6 to 9

The focus on prime meat-bearing elements continues and increases, with the highest relative proportions of upper limbs seen in phases 6 and 7. The number of metapodia, and in particular metatarsals, also increases. High proportions of these elements are often associated with marrow extraction and/or bone-working. This combination of meat and marrow/working material occurs in the period in which firstly sheds are present and secondly House 312 and an outhouse are built. This difference in the proportions of these elements is unlikely to be linked to a difference in

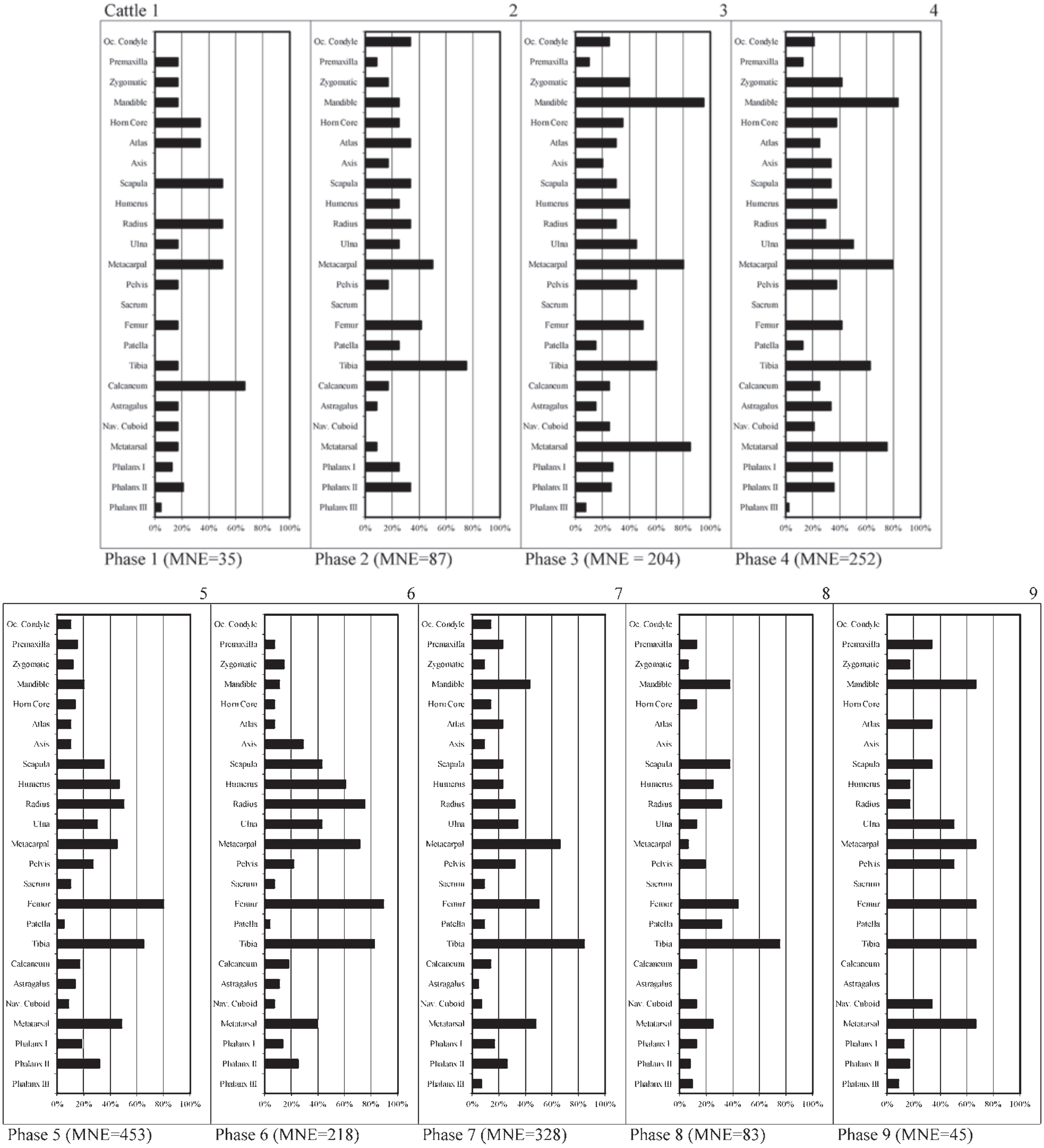

Figure 18.3. Relative abundance of body parts for cattle by phase

the source of the material as phase 4 and phases 6 and 7 all have large quantities of bone from midden contexts and yet the proportions are higher in phases 6 and 7.

CATTLE

The smaller numbers of cattle at the site, a maximum MNI of 30 (phase 5) and a minimum MNI of 3 (phases 1 and 9), results in a few phases where the MNE does not exceed 100. Therefore the distributions within phases 1, 2, 8 and 9 may not provide clear accounts of site processes and are only briefly considered.

In all phases the majority of cattle elements are present in small numbers (Figure 18.3). The exception is the absence in some phases of some head and neck elements, of the third phalanx and of sacral elements. The former is probably related to the removal and processing of the head elsewhere, whilst the lack of third toes does point to a different treatment for these relatively large elements. The third phalanx, unlike the first two, is sheathed in horn and this may account for the variation in processing. As noted above, sacra are often fragmented beyond recognition and are rarely common in assemblages.

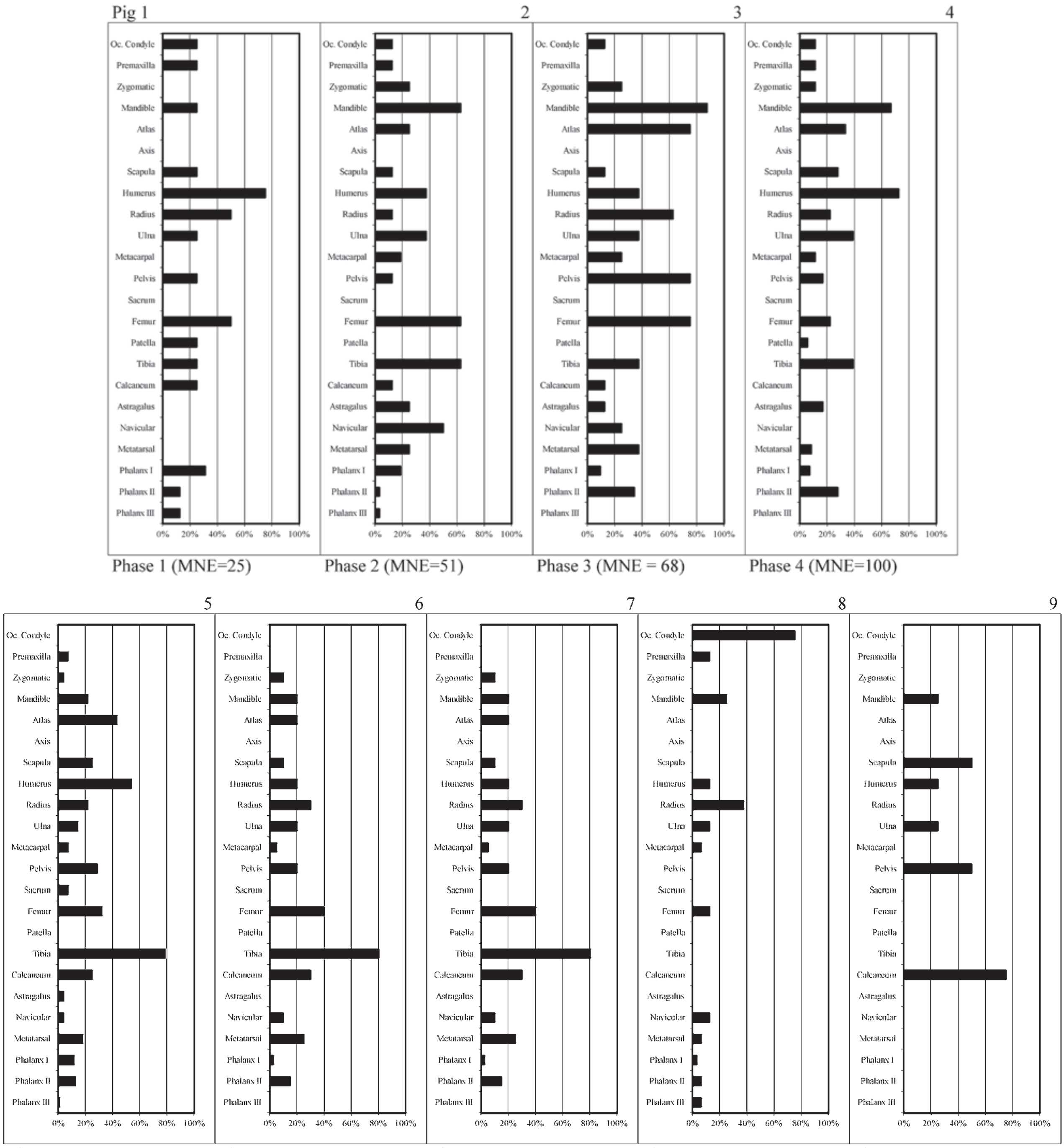

Figure 18.4. Relative abundance of body parts for pig by phase

Phases 1 and 2

Phase 1 has elements from the head and neck, both upper and lower limbs, and is dominated by the robust radius and calcaneum. Phase 2 has material from across the carcass; the tibia is dominant.

Phases 3 to 5

In these larger assemblages mandibles, tibia and metapodia dominate phases 3 and 4. These are all robust elements and a predominance of the latter suggests a possible focus on marrow extraction/bone- working (see *Sheep: Phases 6 to 9*, above). The pattern changes in phase 5, where an increasing focus on fore and hindlimb meat-bearing elements can be seen. This, combined with a relative lack of extremities, suggests a focus on the deposition of material associated with consumption.

Phase 6 to 9

Phase 6 is similar to phase 5, with an emphasis on meat-bearing elements. In phase 7 the emphasis shifts back to the lower limb, with a high proportion of tibia and metapodia, and an increasing number of mandibles, again indicative

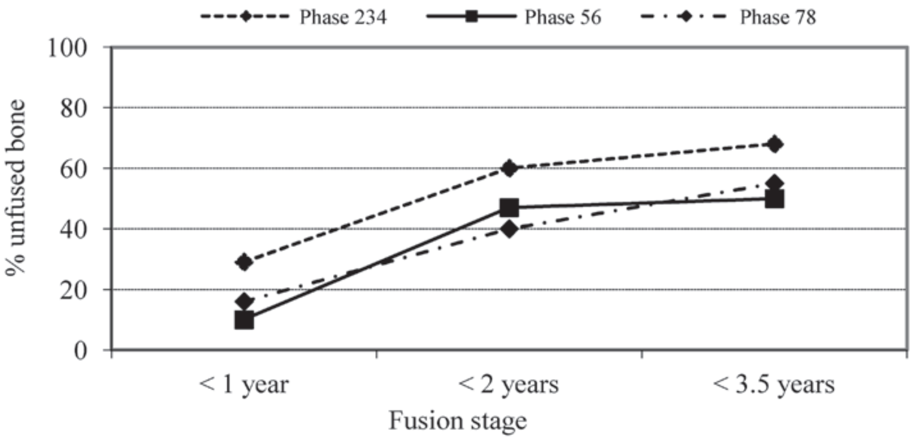

Figure 18.5. Fusion ageing of sheep by phase

of material with a lower meat value. The small sample in phase 8 is dominated by the hindlimb, in particular the robust tibia, and the associated femur and patella indicative of prime meat consumption. Other elements of the upper forelimb and mandible are also common, suggesting the deposition of other food waste bones.

PIG

For the smaller pig sample the maximum number of animals represented is 14 (in phase 5) and the minimum is 2 (in phases 1 and 9). Only phases 4 and 5 have an MNE of over 100, whilst phases 1, 6, 8 and 9 have less than 50 total MNE. Overall, meat bones are present, there are few neck elements or sacral elements, and only small numbers of third toes (Figure 18.4).

Phases 1 and 2

Phase 1 has elements of the head, fore and hindlimbs and feet present, but not the neck or metapodia. Phase 2, in comparison, has larger numbers of mandibles and bones of the hindquarter (from femur to metatarsal) and a smaller proportion of forequarter limbs, with relatively low numbers of toes.

Phases 3 to 5

Phases 3 and 4 (House 700 and House 500 Stage I) have high numbers of mandible and atlas elements, suggesting the presence of heads. Both fore and hindlimbs are also abundant in phase 3, with a distinct focus on the front forequarter in phase 4, and this points to the deposition of prime meat waste. In phase 5 the assemblage is dominated by the tibia, but other hindlimb and forelimb prime meat elements, as well as bones of the neck, are present in large numbers.

Phases 6 to 9

The smaller samples in the later phases show a predominance of tibia in phase 6 and the upper forelimbs in phase 7. The smaller phases 8 and 9 demonstrate the presence of only a few elements from across the skeleton, including head elements in the former and the calcaneum in the latter.

Ageing information: fusion

The fusion information is presented in Tables 18.4 (sheep), 18.5 (cattle) and 18.6 (pig) and Figures 18.5–18.7. The samples for the smaller early and later phases have been included for fullness; however, these are too small for valid individual phase analyses. The following discussion focuses on grouped analysis of phases 2 to 4, phases 5 and 6, and phases 7 and 8, and the percentages given below are for these grouped phases.

Sheep

Overall there is a smaller quantity of unfused bone from animals of less than one year (13%–32%) compared to the higher levels found for cattle (19%–58%). The group of early occupation phases (2 –4) shows a higher proportion of unfused bone than the later ones, for example 32% unfused bone for animals under one year and 63% for animals under two years of age, compared to the later phases (7 and 8; 20%–49%), suggesting a higher rate of slaughter between 1 and 2 years for the earlier phase. In the later phases, the rates of slaughter are more similar.

The proportion of neonatal shafts can be compared to the total numbers of shafts with ageing information. In the combined phase groups, the proportion of neonatal sheep bone ranges between 21% in the early phase group and 18% in phases 5/6. Thus dead lambs were returned to the site, and became incorporated within the house and midden deposits.

Cattle

In cattle the proportion of bone from animals under one year increases over time; it rises from 19% in phases 2–4 to 54% in phases 5/6, and in phases 7/8 to 58%. Phases 2–4 see an increase in the rate of slaughter after this, reaching similar levels to phases 5/6. In phases 7/8 the proportion of unfused bone is high for the <3 year group and then falls again for the <4 year group.

In the combined phases the proportion of neonatal bone ranges from 33% to 43%, with the highest level in phases 5/6. This indicates a higher degree of neonatal mortality compared to sheep, and the presence of dead calves on the site.

Table 18.4. Fusion data for sheep at Cille Pheadair

Phase 1	**Sheep/Goat**				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.		1		
	Radius p.		1	2	
	Scapula	1			
	Pelvis	1			
Subtotal < 1 year		2	2	2	67
	Tibia d.				
	Metacarpal d.				
	Metatarsal d.	1		2	
	Metapodial d.		2		
Subtotal < 2 years		1	2	2	80
	Calcaneum	2	4		
	Femur p.		1		
	Radius d.		2	2	
	Ulna p.		1		
	Humerus p.		1		
	Tibia p.				
	Femur d.	3	1		
Subtotal < 3.5 years		5	10	2	67
TOTAL			**Neonates**	**Total**	**% Neonates**
			6	28	21

Phase 2	**Sheep/Goat**				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	1		1	
	Radius p.	5	2		
	Scapula	1			
	Pelvis	2	1		
Subtotal < 1 year		9	3	1	31
	Tibia d.		1		
	Metacarpal d.				
	Metatarsal d.	2	9		
	Metapodial d.	1		1	
Subtotal < 2 years		3	10	1	79
	Calcaneum	1	4	1	
	Femur p.	1	2		
	Radius d.		4		
	Ulna p.		1		
	Humerus p.	1	1	1	
	Tibia p.		1		
	Femur d.	2			
Subtotal < 3.5 years		5	13	2	72
TOTAL			**Neonates**	**Total**	**% Neonates**
			4	47	9

Phase 3	**Sheep/Goat**				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	5		1	
	Radius p.	5	2		
	Scapula	1			
	Pelvis	4		1	
Subtotal < 1 year		15	2	2	21
	Tibia d.	2	1		
	Metacarpal d.		1		
	Metatarsal d.	3	2		
	Metapodial d.	1	5	5	
Subtotal < 2 years		6	9	5	70
	Calcaneum	2			
	Femur p.	1	4		
	Radius d.	1	1		
	Ulna p.		3		
	Humerus p.		1	1	
	Tibia p.	1	1		
	Femur d.		2		
Subtotal < 3.5 years		5	12	1	71
TOTAL			**Neonates**	**Total**	**% Neonates**
			8	57	14

Phase 4	**Sheep/Goat**				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	4		2	
	Radius p.	7	4		
	Scapula	7	2		
	Pelvis	3		2	
Subtotal < 1 year		21	6	4	32
	Tibia d.	10	5	1	
	Metacarpal d.		5		
	Metatarsal d.	3	1	2	
	Metapodial d.	5	6	6	
Subtotal < 2 years		18	17	9	59
	Calcaneum	2	4	1	
	Femur p.	1	8	2	
	Radius d.	3	10	4	
	Ulna p.		1	1	
	Humerus p.		2	2	
	Tibia p.		2	1	
	Femur d.		2	1	
Subtotal < 3.5 years		6	29	12	83
TOTAL			**Neonates**	**Total**	**% Neonates**
			25	122	20

Table 18.4. continued

Phase 5	Sheep/Goat				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	20	1	1	
	Radius p.	24	1		
	Scapula	8		2	
	Pelvis	17	1	2	
Subtotal < 1 year		69	3	5	10
	Tibia d.	15	13	2	
	Metacarpal d.	9	3		
	Metatarsal d.	4	2	1	
	Metapodial d.	2	13	1	
Subtotal < 2 years		30	31	4	54
	Calcaneum	7	7		
	Femur p.	3	4	3	
	Radius d.	4	2		
	Ulna p.	4	1	2	
	Humerus p.	1	3	1	
	Tibia p.	2	3	2	
	Femur d.		3	2	
Subtotal < 3.5 years		21	23	10	52
TOTAL			**Neonates**	**Total**	**% Neonates**
			19	196	10

Phase 7	Sheep/Goat				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	28		1	
	Radius p.	24	5	2	
	Scapula	16		1	
	Pelvis	25	5	4	
Subtotal < 1 year		93	10	8	16
	Tibia d.	19	12	5	
	Metacarpal d.	4	3		
	Metatarsal d.	3	8	2	
	Metapodial d.	4	3	1	
Subtotal < 2 years		30	26	8	53
	Calcaneum	8	13		
	Femur p.	10	8	2	
	Radius d.	8	2	3	
	Ulna p.		3	2	
	Humerus p.		4	1	
	Tibia p.	4	4	6	
	Femur d.	1	3	2	
Subtotal < 3.5 years		31	37	16	54
TOTAL			**Neonates**	**Total**	**% Neonates**
			32	259	12

Phase 6	Sheep/Goat				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	3			
	Radius p.	6	1		
	Scapula	4		1	
	Pelvis	7	1		
Subtotal < 1 year		20	2	1	13
	Tibia d.	8	3		
	Metacarpal d.	7			
	Metatarsal d.				
	Metapodial d.		4		
Subtotal < 2 years		15	7	0	32
	Calcaneum	1	3		
	Femur p.		2		
	Radius d.	2	2		
	Ulna p.		1		
	Humerus p.	1	1	1	
	Tibia p.		3	1	
	Femur d.				
Subtotal < 3.5 years		4	12	2	75
TOTAL			**Neonates**	**Total**	**% Neonates**
			3	63	5

Phase 8	Sheep/Goat				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	6		1	
	Radius p.	5			
	Scapula	1	1		
	Pelvis	5	3	1	
Subtotal < 1 year		17	4	2	26
	Tibia d.	3			
	Metacarpal d.	3	1		
	Metatarsal d.	3			
	Metapodial d.	1	3		
Subtotal < 2 years		10	4	0	29
	Calcaneum	2	2		
	Femur p.	1	1	2	
	Radius d.	1			
	Ulna p.		2		
	Humerus p.	1	1	1	
	Tibia p.		1		
	Femur d.	1		2	
Subtotal < 3.5 years		6	7	5	54
TOTAL			**Neonates**	**Total**	**% Neonates**
			7	55	13

Table 18.4. continued

Phase 9	Sheep/Goat				
	Element	**Fused**	**Unfused**	**Neonate**	**% Unfused**
	Humerus d.	1		2	
	Radius p.	2		2	
	Scapula	2	1	2	
	Pelvis	2	4	1	
Subtotal < 1 year		7	5	7	63
	Tibia d.	7			
	Metacarpal d.		1	1	
	Metatarsal d.			3	
	Metapodial d.				
Subtotal < 2 years		7	1	4	42
	Calcaneum	3	3	1	
	Femur p.		4	1	
	Radius d.			1	
	Ulna p.	1	6		
	Humerus p.			1	
	Tibia p.		2	1	
	Femur d.			1	
Subtotal < 3.5 years		4	15	6	79
TOTAL			**Neonates**	**Total**	**% Neonates**
			17	56	30

Table 18.5. Fusion data for cattle at Cille Pheadair

Phase 1	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	2			
	Pelvis				
Subtotal < 1 year		2	0	0	0%
	Humerus d.				
	Radius p.	1		1	
	Phalanx II	2	2		
	Phalanx I	2	1		
Subtotal < 2 years		5	3	1	44%
	Tibia d.				
	Metapodial d.	1	3	1	
	Calcaneum	1	1		
Subtotal < 3 years		2	4	1	71%
	Femur p.				
	Femur d.				
	Ulna p.				
	Radius d.		1	1	
	Tibia p.				
	Humerus p.				
Subtotal < 4 years		0	1	1	100%
TOTAL			**Neonates**	**Total**	**% Neonates**
			3	20	15

Table 18.5. continued

Phase 2	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	2			
	Pelvis				
Subtotal < 1 year		2	0	0	0%
	Humerus d.				
	Radius p.	1		1	
Subtotal < 2 years		1	0	1	50%
	Tibia d.		1	1	
	Metacarpal d.	1	2		
	Metatarsal d.	1	1		
	Metapodial d.				
	Calcaneum	1	2		
Subtotal < 3 years		3	6	1	70%
	Femur p.		2		
	Femur d.		1	1	
	Ulna p.		1	1	
	Radius d.	1	1	1	
	Tibia p.		1	1	
	Humerus p.		2		
Subtotal < 4 years		1	8	4	92%
TOTAL			**Neonates**	**Total**	**% Neonates**
			6	27	22

Phase 3	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	2			
	Pelvis	4			
Subtotal < 1 year		6	0	0	0%
	Humerus d.			1	
	Radius p.	3		1	
	PhalanxII	18	1		
	Phalanx I	7	5	1	
Subtotal < 2 years		28	6	3	24%
	Tibia d.	1	2	2	
	Metapodial d.	5	4		
	Calcaneum			1	
Subtotal < 3 years		6	6	3	60%
	Femur p.	2	1	2	
	Femur d.	1	1	1	
	Ulna p.				
	Radius d.		1	1	
	Tibia p.			1	
	Humerus p.				
Subtotal < 4 years		3	3	5	73%
TOTAL			**Neonates**	**Total**	**% Neonates**
			11	69	16

Table 18.5. continued

Phase 4	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	2		1	
	Pelvis	1	1		
Subtotal < 1 year		3	1	1	40%
	Humerus d.	1		1	
	Radius p.	4		1	
Subtotal < 2 years		5	0	2	29%
	Tibia d.	4	2		
	Metacarpal d.		3		
	Metatarsal d.	2	1		
	Metapodial d.	3	7		
	Calcaneum		2		
Subtotal < 3 years		9	15	0	63%
	Femur p.		2	2	
	Femur d.				
	Ulna p.		4		
	Radius d.	1		1	
	Tibia p.	3	1		
	Humerus p.		3		
Subtotal < 4 years		4	10	3	76%
TOTAL			**Neonates**	**Total**	**% Neonates**
			6	53	11

Phase 5	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	3		3	
	Pelvis	6		3	
Subtotal < 1 year		9	0	6	40%
	Humerus d.	9	1	8	
	Radius p.	10		5	
Subtotal < 2 years		19	1	13	42%
	Tibia d.	9	4	1	
	Metacarpal d.	6	2		
	Metatarsal d.	5		3	
	Metapodial d.	1	13		
	Calcaneum		5	1	
Subtotal < 3 years		21	24	5	58%
	Femur p.	7	4	7	
	Femur d.	4	1	7	
	Ulna p.	2	1	1	
	Radius d.	4	3	5	
	Tibia p.	3	2	2	
	Humerus p.	3	7	8	
Subtotal < 4 years		23	18	30	68%
TOTAL			**Neonates**	**Total**	**% Neonates**
			54	169	32

Phase 6	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	1	1	4	
	Pelvis		1	1	
Subtotal < 1 year		1	2	5	88%
	Humerus d.	1		5	
	Radius p.	4		2	
Subtotal < 2 years		5	0	7	58%
	Tibia d.	5	1		
	Metacarpal d.	1	2		
	Metatarsal d.				
	Metapodial d.	1	2		
	Calcaneum	1	1		
Subtotal < 3 year		8	6	0	43%
	Femur p.	2	3	4	
	Femur d.			3	
	Ulna p.	2	1		
	Radius d.	2	1	1	
	Tibia p.	2	3	1	
	Humerus p.	2		6	
Subtotal < 4 years		10	8	15	70%
TOTAL			**Neonates**	**Total**	**% Neonates**
			27	67	40

Phase 7	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	3		6	
	Pelvis	7	4	4	
Subtotal < 1 year		10	4	10	58%
	Humerus d.	5	1		
	Radius p.	5	1	1	
Subtotal < 2 years		10	2	1	23%
	Tibia d.	1	4	5	
	Metacarpal d.	4	1	3	
	Metatarsal d.	4	5	4	
	Metapodial d.		1	2	
	Calcaneum	1	3		
Subtotal < 3 years		10	14	14	74%
	Femur p.	6	3	3	
	Femur d.	1	2	4	
	Ulna p.	1	1	3	
	Radius d.	1	1	1	
	Tibia p.	6	3	5	
	Humerus p.	2	1	1	
Subtotal < 4 years		17	11	17	62%
TOTAL			**Neonates**	**Total**	**% Neonates**
			42	120	35

Table 18.5. continued

Phase 8	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	2		2	
	Pelvis	1		1	
Subtotal < 1 year		3	0	3	50%
	Humerus d.	2		2	
	Radius p.	2			
Subtotal < 2 years		4	0	2	33%
	Tibia d.				
	Metacarpal d.				
	Metatarsal d.		1		
	Metapodial d.		1		
	Calcaneum			1	
Subtotal < 3 years		0	2	1	100%
	Femur p.		1	1	
	Femur d.	1		1	
	Ulna p.				
	Radius d.		1		
	Tibia p.	3			
	Humerus p.	1			
Subtotal < 4 years		5	2	2	44%
TOTAL			**Neonates**	**Total**	**% Neonates**
			8	24	33

Phase 9	Cattle				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Scapula	1		2	
	Pelvis				
Subtotal < 1 year		1	0	2	67%
	Humerus d.	1		1	
	Radius p.				
Subtotal < 2 years		1	0	1	50%
	Tibia d.			1	
	Metacarpal d.	2			
	Metatarsal d.				
	Metapodial d.				
	Calcaneum				
Subtotal < 3 years		2	0	1	33%
	Femur p.		1	1	
	Femur d.			3	
	Ulna p.				
	Radius d.			1	
	Tibia p.				
	Humerus p.				
Subtotal < 4 years		0	1	5	100%
TOTAL			**Neonates**	**Total**	**% Neonates**
			9	14	64

Table 18.6. Fusion data for pigs at Cille Pheadair

Phase 1	Pig				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Humerus d.			2	
	Radius p.	2			
	Scapula	1			
	Pelvis				
Subtotal < 1 year		3	0	2	40%
	Metacarpal d.				
	Metatarsal d.				
	Metapodial d.			1	
	Tibia d.				
Subtotal < 2 years		0	0	1	100%
	Calcaneum				
Subtotal < 3 years		0	0	0	0%
	Femur p.		1	1	
	Femur d.		1	1	
	Ulna p.		1		
	Radius d.		1		
	Humerus p.			2	
	Tibia p.				
Subtotal < 4 years		0	4	4	100%
TOTAL			**Neonates**	**Total**	**% Neonates**
			7	14	50

Phase 2	Pig				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Humerus d.	1	1		
	Radius p.				
	Scapula				
	Pelvis		1		
Subtotal < 1 year		1	2	0	67%
	Metacarpal d.	1	1		
	Metatarsal d.		3		
	Metapodial d.			1	
	Tibia d.		2	1	
Subtotal < 2 years		1	6	2	89%
	Calcaneum		1		
Subtotal < 3 years		0	1	0	100%
	Femur p.		2	1	
	Femur d.			1	
	Ulna p.				
	Radius d.		1		
	Humerus p.				
	Tibia p.		1	1	
Subtotal < 4 years		0	4	3	100%
TOTAL			**Neonates**	**Total**	**% Neonates**
			5	20	25

Table 18.6. continued

Phase 3	Pig				
	Element	Fused	Unfused	Neonate	% unfused
	Humerus d.	1	1		
	Radius p.	1	1		
	Scapula				
	Pelvis		1	3	
Subtotal < 1 year		2	3	3	75%
	Metacarpal d.	1	3		
	Metatarsal d.	1	2		
	Metapodial d.		1		
	Tibia d.		1		
Subtotal < 2 years		2	7	0	78%
	Calcaneum		1		
Subtotal < 3 years		0	1	0	100%
	Femur p.		1	1	
	Femur d.		1	1	
	Ulna p.				
	Radius d.		1		
	Humerus p.				
	Tibia p.		1		
Subtotal < 4 years		0	4	2	100%
TOTAL			Neonates	Total	% Neonates
			5	24	21

Phase 5	Pig				
	Element	Fused	Unfused	Neonate	% unfused
	Humerus d.	2	3	1	
	Radius p.	4	1	1	
	Scapula	1	1	1	
	Pelvis	3	2	1	
Subtotal < 1 year		10	7	4	52%
	Metacarpal d.		3		
	Metatarsal d.	1	2		
	Metapodial d.		4		
	Tibia d.		3	1	
Subtotal < 2 years		1	12	1	93%
	Calcaneum		4	1	
Subtotal < 3 years		0	4	1	100%
	Femur p.		2	3	
	Femur d.		1	3	
	Ulna p.		1		
	Radius d.				
	Humerus p.	2	1	8	
	Tibia p.	1	2	1	
Subtotal < 4 years		3	7	15	88%
TOTAL			Neonates	Total	% Neonates
			21	65	32

Phase 4	Pig				
	Element	Fused	Unfused	Neonate	% unfused
	Humerus d.		2	4	
	Radius p.	3	1		
	Scapula			1	
	Pelvis		1	1	
Subtotal < 1 year		3	4	6	77%
	Metacarpal d.		4		
	Metatarsal d.	1	2		
	Metapodial d.		2	2	
	Tibia d.	1	3	1	
Subtotal < 2 years		2	11	3	88%
	Calcaneum				
Subtotal < 3 years		0	0	0	0%
	Femur p.				
	Femur d.				
	Ulna p.				
	Radius d.		3		
	Humerus p.			4	
	Tibia p.		1	1	
Subtotal < 4 years		0	4	5	100%
TOTAL			Neonates	Total	% Neonates
			14	38	37

Phase 6	Pig				
	Element	Fused	Unfused	Neonate	% unfused
	Humerus d.				
	Radius p.	1			
	Scapula	1			
	Pelvis	2			
Subtotal < 1 year		4	0	0	0%
	Metacarpal d.	1			
	Metatarsal d.	3	1		
	Metapodial d.				
	Tibia d.				
Subtotal < 2 years		4	1	0	20%
	Calcaneum		1	1	
Subtotal < 3 years		0	1	1	100%
	Femur p.		1		
	Femur d.				
	Ulna p.				
	Radius d.				
	Humerus p.				
	Tibia p.				
Subtotal < 4 years		0	1	0	100%
TOTAL			Neonates	Total	% Neonates
			1	12	8

Table 18.6. continued

Phase 7	Pig				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Humerus d.	1			
	Radius p.	3		1	
	Scapula	1			
	Pelvis	2	1		
Subtotal < 1 year		7	1	1	22%
	Metacarpal d.		1		
	Metatarsal d.		3	1	
	Metapodial d.		2		
	Tibia d.		2		
Subtotal < 2 years		0	8	1	100%
	Calcaneum		1		
Subtotal < 3 years		0	1	0	100%
	Femur p.		3		
	Femur d.				
	Ulna p.				
	Radius d.		1		
	Humerus p.		2		
	Tibia p.		1		
Subtotal < 4 years		0	7	0	100%
TOTAL			**Neonates**	**Total**	**% Neonates**
			2	26	8

Phase 9	Pig				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Humerus d.				
	Radius p.				
	Scapula	2			
	Pelvis			1	
Subtotal < 1 year		2	0	1	33%
	Metacarpal d.				
	Metatarsal d.				
	Metapodial d.				
	Tibia d.				
Subtotal < 2 years		0	0	0	0%
	Calcaneum		2		
Subtotal < 3 years		0	2	0	100%
	Femur p.			1	
	Femur d.				
	Ulna p.				
	Radius d.				
	Humerus p.				
	Tibia p.				
Subtotal < 4 years		0	0	1	100%
TOTAL			**Neonates**	**Total**	**% Neonates**
			2	6	33

Phase 8	Pig				
	Element	**Fused**	**Unfused**	**Neonate**	**% unfused**
	Humerus d.		1		
	Radius p.	2	1		
	Scapula				
	Pelvis				
Subtotal < 1 year		2	2	0	50%
	Metacarpal d.	1			
	Metatarsal d.		1		
	Metapodial d.		1		
	Tibia d.		1	1	
Subtotal < 2 years		1	3	1	80%
	Calcaneum			1	
Subtotal < 3 years		0	0	1	100%
	Femur p.				
	Femur d.				
	Ulna p.				
	Radius d.				
	Humerus p.		1		
	Tibia p.			1	
Subtotal < 4 years		0	1	1	100%
TOTAL			**Neonates**	**Total**	**% Neonates**
			3	12	25

Pig

The smaller samples of pig bone can provide only outline evidence of the age of slaughter in all periods. The percentage of unfused bone is high in all phase groups; the data suggest that pigs were slaughtered slightly at a younger age in the earlier phases. Overall, few adult animals were recorded. The percentage of neonatal bone is higher than that for cattle, at 53% and 44% in the two larger phase groups (phases 2 to 4 and phases 5/6). This highlights the consumption of suckling animals, the use of pigs purely for slaughter products and the large number of piglets that a single sow can produce.

Ageing information: dentition

The dentition evidence presents a slightly different ageing pattern to the fusion evidence. The general trends remain but the proportions of neonates as described by dental wear is much less than that from long bones. This may be a product of carcass processing, with the heads of neonates not returned to the site.

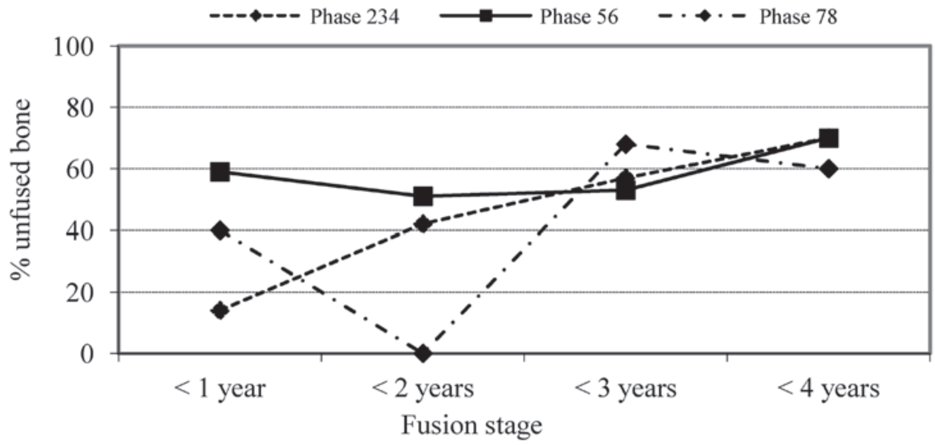

Figure 18.6. Fusion ageing of cattle by phase

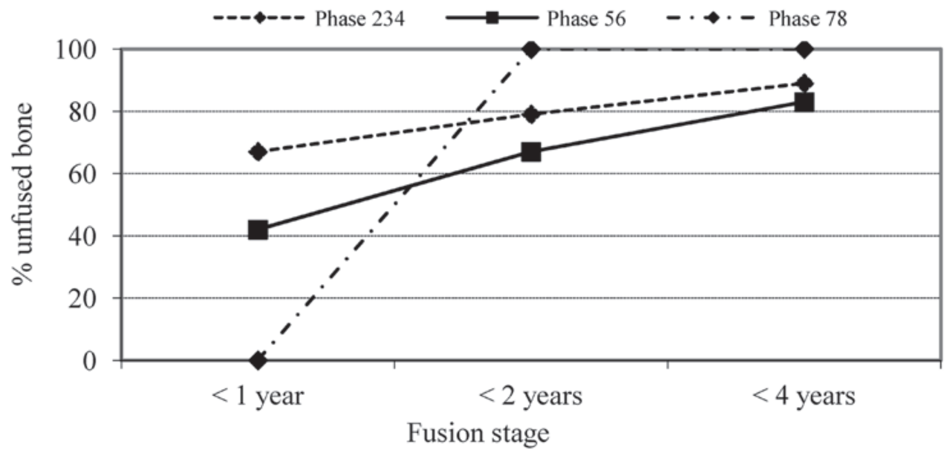

Figure 18.7. Fusion ageing of pig by phase

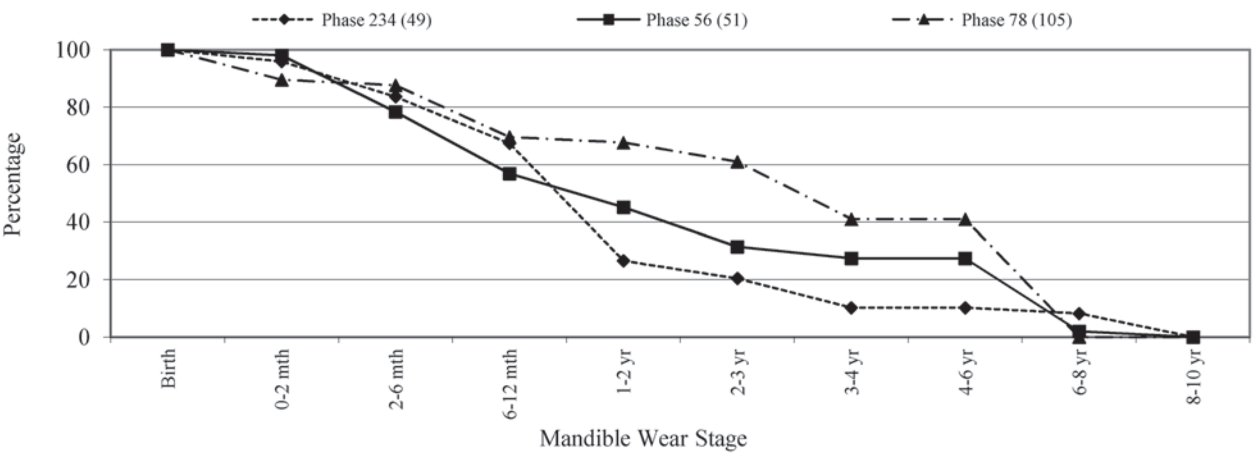

Figure 18.8. Dental ageing of sheep by phase

Sheep

The dental evidence demonstrates a change in the timing of sheep slaughter over time. Contrary to the fusion evidence, the dental data suggest a higher rate of slaughter of younger animals (Figure 18.8). For example, in phases 2–4, a few individuals can be aged to under 2 months and the highest rate of slaughter was between 6–12 months and 1–2 years; over 70% of the population was slaughtered by the age of 1–2 years. By phases 7/8, animals were living much longer: over 60% of sheep lived to 2–3 years.

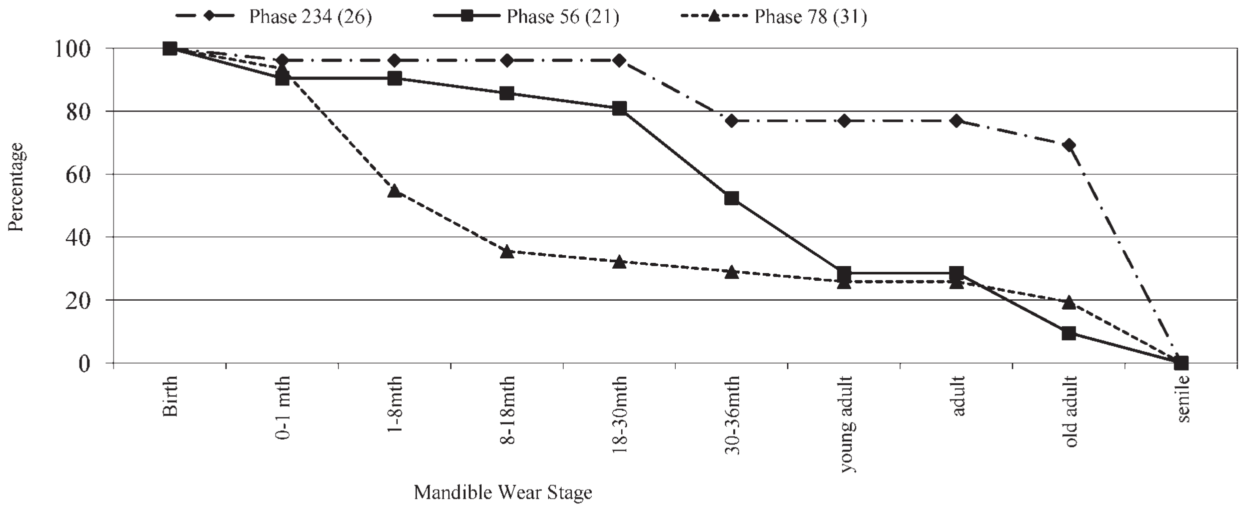

Figure 18.9. Dental ageing of cattle by phase

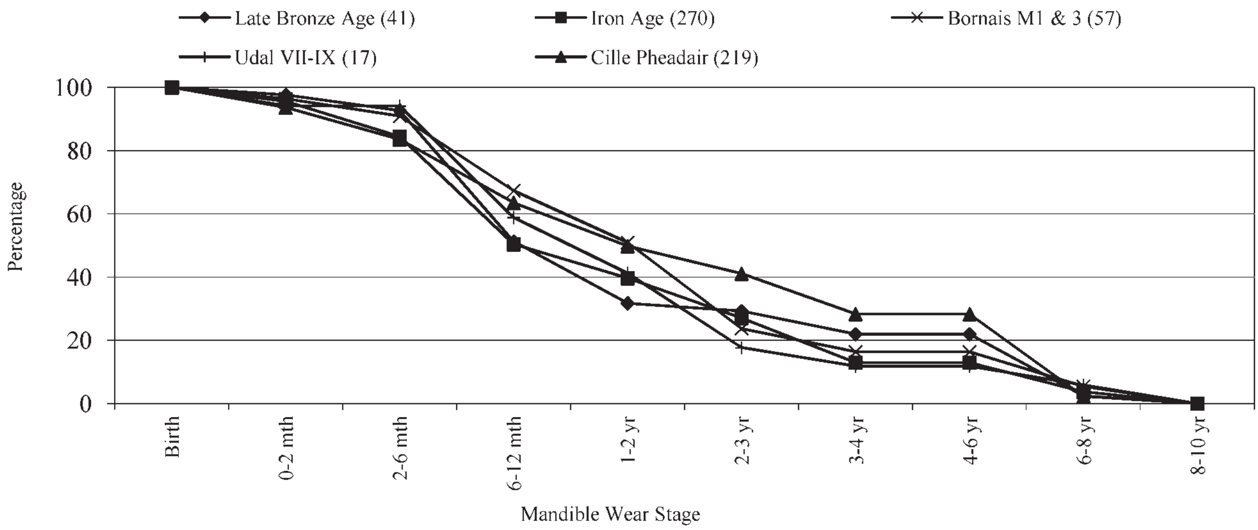

Figure 18.10. Sheep dental ageing by site

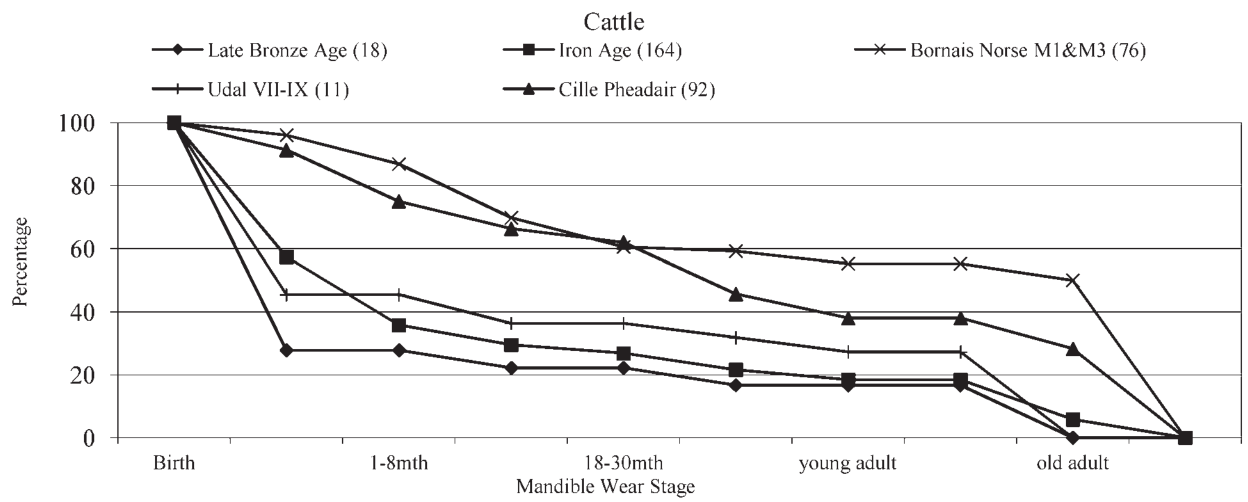

Figure 18.11. Cattle dental ageing by site

Table 18.7. Dental ageing of pigs at Cille Pheadair

Phase	Neonatal	Juvenile	Immature	Sub-adult	Adult	Elderly	Total
Phases 1/2					1		1
Phases 3/4/5	1		1		2		4
Phase 6							0
Phases 7/8		1		6	15		22
Phase 9					1		1
Total	1	1	1	6	19		28

Table 18.8. Sexing of mammal species at Cille Pheadair

Species	Element	Female	Female?	Male	Male?	Total	Female:Male
Cattle	Pelvis	10	1	1	2	**14**	3.7:1
Goat	Pelvis	2				**2**	All female
Sheep	Horn Core	1		1		**2**	1:1
	Pelvis	10				**10**	All female
Sheep/Goat	Pelvis	26	10	8	2	**46**	3.6:1
Total Sheep/Goat		*39*	*10*	*9*	*2*	*60*	*4.9:1*
Pig	Upper Canine	4				**4**	All female
	Lower Canine	4		3		**7**	1.3:1
	Mandible	1		3		**4**	0.3:1
Red Deer	Antler			3		**3**	All male

Cattle
There is less evidence available from cattle dentition but an increase in the rate of slaughter of cattle, similar to that noted in the fusion data, can be seen (Figure 18.9). In the small data set from phases 2–4, a few cattle were killed at 2–3 years but the majority of animals survived until 8–10 years of age. The great age of these animals suggests their use for secondary products, such as milk and traction, but the absence of dental evidence for extremely young stock indicates that the former was not accompanied by the disposal of excess calves.

In phases 5/6 more animals died younger overall and the slaughter of animals aged 18–30 months onwards is pronounced. The overall impression in these phases is of the deposition of prime cattle, slaughtered at an age to maximize meat production. Phase 7/8 shows a pronounced cull of animals between the age of 1 month and 8 months, and continues into the 8–18 month age group. This is likely to represent the specialized autumnal slaughter of excess young stock, leaving only small numbers of stock for breeding and/or secondary products.

Pig
The only significant dental ageing information comes from phases 7/8. Here only one animal was under 24 months and the majority of animals (*c.* 70%) were aged over 24 months (Table 18.7). This fits in with the fusion information, suggesting that few young animals were present in the later phases. This pattern suggests that pigs were not being intensively exploited for food at the earliest opportunity but were kept until fully mature before being consumed as prime animals.

Sex
The morphological evidence for the numbers of males and females of various mammal species is obtained from pelves and canines. Table 18.8 indicates that, for both cattle and sheep, the majority of sexable remains are female: over three-quarters are female/possible female and a quarter or fewer male/possible male. This large number of females is relatively common in breeding populations, where females tend to predominate given their usefulness in breeding and milk production. The only two sexable pelves of goats are both female whilst the three sexable pig canines both come from males. Goats are known for their use as dairy animals and male pig teeth are larger than those of females, which may account for their predominance. The small sample sizes for these two species does, however, preclude any secure interpretation,

Minor species of terrestrial mammals

In addition to the main food animals, a number of other domesticates are present.

Horse

On South Uist, horse is recorded only once for the Bronze Age, and is at present known at only some of the Iron Age sites in small quantities. It is only with the arrival of the Norse that horses are present in greater numbers at all sites. Cille Pheadair has 65 fragments of horse bone, about 1% of the assemblage overall. When present, horse makes up between 0.4% and 1.4% of any individual phase and is most abundant in phases 4, 5, 6 and 7.

Phase 3 contains only a scapula and a humerus; phase 4 has bones of the head, neck, hindlimb and a toe, and all the material in both phases is derived from individual contexts. The largest numbers of horse bones were recovered from phase 5, mostly from midden deposits. Some of these contexts contain more than one element, but no articulating bone, or elements of the same side were noted. In the eastern midden, context 010 held elements of the fore and hindlimb, from both left and right sides. An astragalus, calcaneum and phalanx were gnawed. Context 308, also in the eastern midden, produced a radius and a metapodial. Context 125, in the house forecourt, held a neonatal calcaneum and an older metacarpal fragment, whilst a sand infill (507) of House 500 Stage II produced five fragments of a single horse mandible and a gnawed metatarsal. Overall, bones from the head (the mandible) to the toes of horses are present in phase 5, suggesting that entire animals were present at the site. The recovery of neonatal material suggests that at least some of these animals were breeding stock.

Material in phase 6 is dominated by metapodia, with seven fragments present; the other material is a humerus, radius and ulna and two tibias. Although the material was mostly found in just two contexts, there is no evidence of an association between the bones. Two of the bones, a tibia and a metatarsal, are butchered. Both come from the same context and from the same side, and therefore the butchery marks may derive from a single event. This butchery may be linked to horse consumption. However, the bones, like many others, are gnawed and the butchery could reflect carcass division before feeding to the dogs.

Apart from a tibia recovered from a midden layer, only bones from the limb extremities were recovered from phase 7. Two complete right metapodia and two phalanges were recovered from a single context, and two other metapodia were found in different midden contexts. Although these do not articulate, they could indicate waste from horse skins. In phase 8, horse bone was recovered in small quantities from cuts for the walls of House 007 with two femur fragments and a first phalanx present; a first phalanx and a lower molar came from floor deposits of the same house; a scapula was from Outhouse 006 and a scapula came from a sand deposit. A single navicular was recovered in phase 9.

Dog

Dog is present in most phases but only in small amounts. There are many instances where more than one dog bone was recovered from a single context, but no articulated bone is recorded. The lack of dog remains compared to the high level of gnawing suggests that more dogs were present at the site than are represented by the carcasses in the analysed remains.

Phase 1 contains only a single fragment of metapodia. The phase 3 assemblage of dog remains includes a left and right jaw, possibly of the same individual, found in the midden, and the mandible of a young individual and another mandible fragment from the sandbank extension. In phase 4, dog remains were again recovered from the midden, with three of the five bones coming from a single context (317).

In phase 5, a left and right astragalus and an unfused calcaneum were all recovered from a single layer in the southeastern midden (114), with a humerus, astragalus and femur recovered from a windblown sand layer (351). The pair of dog astragali have similar measurements (155mm, 157mm), which suggests they belong to a single animal. Other material was scattered through the midden and sand fills. Three of the ten bones were gnawed; all were recovered from sand fills, suggesting that this material, but not that in the midden, was accessible to dogs prior to final burial.

Material in phase 6 derives from different contexts, with a single scapula recovered from floor layers. Phase 7 contained the remains of at least two dogs, with two right and two left femurs, and a right and left dog humerus present. Apart from a first phalanx, these were the only elements recovered and were spread through different contexts, with four of the seven bones derived from midden contexts. A single incidence of gnawed dog bone was recorded from the midden. Phases 8 and 9 contained only a single element each.

Ageing information is sparse with two unfused calcanea – a late fusing bone – recorded and two 'young' mandibles; all other bone is fused, suggesting a mostly adult population.

Cat

Cat bones are present in all phases, generally in very low numbers, making up less than 1% of the assemblage, in similar quantities to dog. A single unfused tibia was present in phase 1, and an ulna and a femur in phase 2, both fused. Phase 3 produced an adult mandible and an unfused proximal epiphysis from a tibia. In phase 4 the majority of remains came from a midden context 317; this context contained the majority of dog bone as well. In the assemblage from 317 are an atlas, a scapula, paired right and left unfused ulnas, a calcaneum and three unfused metapodia that probably derive from a single individual.

Two animals are represented in midden contexts in phase 5, with an adult and a juvenile right tibia in context 308; also present in this context are unfused humerus, radius and

Figure 18.12. Knife-cuts on the buccal surface of a cat mandible consistent with skinning

Figure 18.13. A small slot cut across the distal tibia of a cat, as if to make a whistle (SF 2812)

fibula; an unfused calcaneum came from context 010. Phase 6 contains two mandibles, phase 7 an ulna and juvenile mandible with the adult carnassial unerupted, and hence from an animal younger than six months. Phase 8 produced an unfused left proximal tibia, an unfused right distal tibia and a cervical vertebra (counted as hare/fox size in Table 18.1), and phase 9 two metapodials.

The presence of fused and unfused bone indicates that a proportion of younger animals were dying on site. Only one cat bone was recorded as gnawed, although the small size of the assemblage would probably preclude the survival of any canid activity. Two specimens are of particular interest: the phase 7 mandible shows vertical knife-cuts on the buccal surface consistent with skinning (Figure 18.12). The distal tibia from phase 8 is worked, having had a small slot cut across the shaft as if to make a whistle or similar (SF 2812; Figure 18.13; see also Figure 14.3). This find appears so far to be unique.

Wild animals

Although the assemblage is dominated by domestic animals, there is also evidence for the procurement of wild terrestrial mammals. This evidence includes a number of records of juvenile hare bones: three unfused hare femurs and an unfused metapodial from midden contexts 308 and 114 in phase 5. A couple of juvenile rabbit femurs were also noted in this phase, with a further juvenile bone found in phase 3. Although it is possible that hare bone is present, its identification from juvenile bone is somewhat problematic, particularly in the light of the high levels of modern rabbit activity seen on site. This identification should be regarded as tentative, as although the archaeological levels were protected by over 3m of windblown sand on excavation, historical rabbit burrowing might have occurred.

Red deer

Accounting overall for 2% of the total bone, red deer are more abundant than horses. Antler fragments account for 23% of the total red deer bone recorded, and is the predominant element in phase 1 and phases 3–7. The quantification of antler is extremely problematic, hence all antler fragments were recorded but not included in the NISP figures in Table 18.1 and estimates of the number of individual antlers represented is impossible.

The frequency of deer bone in the assemblage falls and then increases through the sequence, with 2% or above in phases 1 and 2, declining to less than 2% in phases 3 and 4, and then steadily increasing through time with phases 8 and 9 having 4% and 5%. There is evidence for animals from a range of ages, with both neonates and adults present, and a variety of elements.

Phase 1 contained an antler, a scapula, two humeri, a magnum and a pelvic fragment. Material in phase 2 came mostly from midden contexts and includes antler, elements of the fore and hindlimb, the hock joint and phalanges. Four elements, two of which are antler, show gnawing.

Phase 3 produced cut/chopped worked antler, meat and waste bones in small quantities. The only evidence for red deer skulls is found in phase 4; three right occipital condyles indicate the presence of at least three skulls, all derived from floor layers. There are also three left mandibles present; two of these were recovered from within the house. The largest amount of antler fragments derives from the midden. Fragments of humerus, tibia, calcaneum and a number of toes were also recovered.

In phase 5, the red deer assemblage is dominated by metapodia (representing at least five animals) and antler. Elements of the neck, limbs (tibia of at least four individuals) and toes are also present. The material mostly derived from midden layers. The smaller assemblage in phase 6 is also dominated by metapodia, with a mandible, limb bones and toes also present. In this phase the majority of deer bone was found in sand fill layers.

In phase 7, red deer remains were recovered from both House 312 and associated midden contexts; antler fragments, mandibles and limb bone fragments are present. One of the antlers is a cut shed base, suggesting the gathering of shed antler for working. Phase 8 is dominated by metapodia, with a few upper fore and hindlimb bones, and another cut shed antler base was also recovered. In phase 9, a range of red deer limb bones from all parts of the limb were identified.

Roe deer

The percentage relative abundance of roe deer is small. Present at about 1% in the earlier phases, they are absent

from phases 6, 7 and 8, with a few bones recovered from phase 9. Of the 24 bones present, only one is not a prime meat bone; the most abundant element is the femur, with radius, humerus, tibia, and ulna present in smaller numbers. This pattern indicates that complete animals were not being bought onto the site. The lack of waste bones suggests that, after hunting, animals were butchered away from the site and only meat bones returned. The smaller-sized roe deer bones might not have provided sufficient resources to have justified their return to site.

Otter

There are only five fragments of otter recorded; a scapula came from phase 1, a pelvis and calcaneum from phase 3 and an ulna and sacrum from phase 4.

Marine mammals

Whale, dolphin and seal bones are all reported from the site; the majority of cetacean remains are unidentifiable fragments and have not been quantified. Cetacean bone is also represented within the worked bone assemblage, and within this material a wide range of species has been identified, as discussed in Chapter 14 and in Mulville (2002). The presence of cetaceans and pinnipeds on Outer Hebridean sites of all periods is fairly typical, although generally not in large numbers (Mulville 1999).

A range of cetacean species was identified in the artefact assemblage, mostly identified from relatively intact vertebrae, and includes blue whale, sperm whale, killer whale, pilot whale, bottlenose whale and minke whale. Two artefacts, a cleaver or scraper (SF 2157, context 590, phase 1) and one described as a perforated tooth plate (SF 1848 context 539, phase 4) have been identified as being made from the mandibles of Balaenoptera, which have a very dense and robust structure. These bones are composed almost entirely of solid cortical bone and near the articulation with the skull form a solid slab of parallel-sided bone (O'Connor 1987). This is known as 'jaw pan' and its strength and utility were exploited by a number of whale bone-utilizing communities in the northern and southern hemispheres (Mulville 2002). Cetacea are a highly prized resource, providing meat and blubber and the bone can be used in building (Childe 1931) and burnt as fuel.

The methods for the procurement of whales during the Norse period remains unclear, whether they were hunted at sea, driven ashore or discovered as natural strandings. Clues can be sought within the range of species represented, as some whales are easier to hunt than others. There is, however, some variation in the utility of the various species: some species' bone is also more useful in tool production or as fuel. The survival of osseous material is hard to relate to procurement strategies. Morphological identification, particularly from fragmented or worked assemblages, is difficult; for example, analysis of material from the Bornais assemblage using ZooMS revealed previously unidentified species within the worked and unworked bone assemblage (right whale and fin whale; Buckley *et al*. 2014).

With regard to common methods of identifying whaling (McCartney 1980), there is neither direct evidence of artefacts or depictions of Norse-period Hebridean whale-hunting nor indirect evidence of prerequisite whaling gear. No harpoons or whaling implements have been recovered from any of the sites. The only bladed tools are the knives and cleavers evidenced by butchery marks, and a few such iron blades in the assemblages; other bladed tools are often not fully identifiable given the poor preservation of iron within the environment (see Chapter 15 for the iron artefacts from Cille Pheadair and Sharples 2005 for the iron artefacts from Bornais Mound 3). There is, however, direct evidence for Norse-period boats at Cille Pheadair and Bornais, primarily in the form of clench nails and roves, and Norse maritime skills and boat-building capabilities are well attested. There is historical and ethnographic evidence for whaling in the Hebrides, Shetland and Orkney, and further afield in the Faeroe islands and Scandinavia (Mulville 2002).

Seals provide meat, blood, blubber, skins and sinew. The blubber is very important as it can provide both a food and a fuel. Whale and dolphin are also good providers of meat and blubber. Blubber could have been used not only as a dietary supplement for humans but also for domestic livestock in periods of stress, as described in Iceland by Lindroth (1937) where seal fat was liquefied and poured over hay.

The Norse-period techniques of hunting the seal and whale are not precisely known but it is likely that this was a seasonal activity. This could have involved either driving dolphins or whales ashore as they pass close to shore, as occurs today on the Faeroes, or taking advantage of occasional beachings. Seals are more difficult to manipulate at sea but they are slow and reasonably defenceless when on land where they can easily be captured and killed. It is not a surprise that a preference for grey seal over the common seal has been noted at other Hebridean sites (Mulville 1999). Grey seal will come ashore to give birth and mate in the autumn and to moult in the spring. In contrast, common seals spend most of their time at sea, even mating and giving birth, making them less accessible.

Comparison with Hebridean sites

To place Cille Pheadair in context, this section examines the evidence for animal management and exploitation in the preceding Iron Age as well as in contemporaneous Norse-period sites. Table 18.9 presents the NISP data for the entire range of mammalian species in the Western Isles. Overall, the Iron Age and Norse-period sites are similar in that they are dominated by sheep and cattle, with smaller amounts of pig present. Whilst domestic species make up the majority of the assemblages, red deer are relatively common, with smaller quantities of dogs, cats, roe deer and other wild fauna present.

Domestic species across the Uists

Table 18.10 presents the relative abundance of just the major domestic species across time in the more substantive

Table 18.9. NISP for Cille Pheadair and other Hebridean settlements of the Late Iron Age and Norse period

	Sheep	Goat	Cattle	Pig	Dog	Cat	Horse	Red deer	Roe deer	Hare	Cetacea	Seal	Otter	Pine marten	Badger	Total
IRON AGE																
Udal (IXc-X)	2122		3232	95	4	9	6	24			1	5		25		5523
Bostadh	525	2	515	6	1		65	236			P	8	19			1377
Dun Vulan	1460		1449	528	9	6	9	43	3	1	47	42	16	1	2	3616
Bornais (Mound 1)	1512		1141	189	1	3	2	466	2		6	5	24			3351
NORSE																
Cille Pheadair	*4400*	*27*	*2775*	*739*	*36*	*34*	*65*	*208*	*24*	*4*	*17*	*53*	*5*	*1*		*8388*
Bornais (Mound 3)	388		248	53	12	2	3	19			P	5	1			731
Bornais (Mound 1)	435		383	56	3	3	5	72	4		28	7	29			1025
Udal (IXc-X)	769		2020	91	16		32		3	4	P	11				2946
Bostadh	175	1	133	10			17	157			P	2	22	1		518

Sources: Serjeantson 2013 (Udal); Thoms 2003 (Bostadh); Mulville 1999 (Dun Vulan); Mulville 2012 (Bornais Mound 1); Mulville 2005 (Bornais Mound 3). The Cille Pheadair total omits the cattle-size and sheep-size bones, which appear in Table 18.1

Table 18.10. Percentage relative abundance for the NISP of major food species at Cille Pheadair and other Hebridean settlements of the Late Iron Age and Norse period

Uists		% Sheep	% Cattle	% Pig
Iron Age	Udal (Phases 11/12/13)	60	39	1
	Dun Vulan M–LIA	43	42	15
	Cill Donnain M–LIA	33	59	8
	Bornais Mound 1 LIA	53	40	7
Norse	Udal (Phases 7/8/9/10)	27	70	3
	Bornais Mounds 1 & 3 Norse	53	40	7
	Cille Pheadair	*56*	*35*	*9*
Lewis and Harris		**% Sheep**	**% Cattle**	**% Pig**
Iron Age	Beirgh	25	72	3
	Cnip	40	54	7
	Bostadh LIA	49	50	1
Norse	Bostadh Norse	42	55	3

published assemblages: Dun Vulan (Mulville 1999), Bornais Mound 1 and Mound 3 (Mulville 2005; Mulville and Powell 2012) and the Udal (Serjeantson 2013) on the Uists, and Cnip and Bostadh on Lewis (Thoms 2003).

On South Uist the proportion of sheep shows a small increase between the Late Iron Age and Norse periods, with a corresponding decrease in the amount of cattle. Sheep make up over half the Norse-period assemblages within both the shorter-term sequence of longhouses at Cille Pheadair (*cal AD 1030–1095* to *cal AD 1160–1245*) and the longer-lived complex of structures at Bornais (*c.* AD 800 to AD 1400). The stable isotope results derived from cattle and sheep at Cille Pheadair and Norse-period Bornais indicate a herbivorous diet that did not include marine plant material or coastal grazing (see section 18.4 below). This suggests that both species were grazed at some distance from the coastline and/or maritime plant communities and were not free to roam and exploit coastal resources. At the Udal, on North Uist, sheep predominate to a greater degree, making up 60% of the Iron Age assemblage and 70% of the Norse period.

The increase in the proportion of sheep at the Udal has been linked by Serjeantson (2013: 95) to demands for tribute. Further afield, on Lewis, the proportion of sheep during the Iron Age varies widely with 25% at Beirgh (Thoms 2014) and 40% at Cnip (McCormick 2006). There are more sheep present at Iron Age Bostadh (Thoms 2003), at a similar level to the South Uist Iron Age sites, but this number declines slightly during the Norse period. These differences may be related to local influences: for example, the abundance of cattle at Cnip has been linked to the site's status (Armit 1992: 237).

The proportion of pig varies across the Uists, with the smallest proportions in all phases at the Udal, which Serjeantson (2013) links to a lack of woodland on this part of the Isles. In South Uist assemblages, the proportion of

pigs is highest at the Iron Age broch of Dun Vulan (15%; Mulville 1999), with only between 3% and 9% in all other assemblages.

In the Norse period overall the proportion of pigs at Cille Pheadair (9%) is higher than at Bornais (7%), although as noted above this figure varies across the different phases. The northerly sites of Bostadh and Beirgh have less than 3% pig during both Iron Age and Norse phases, whilst Cnip has more than double this proportion at 7%. The relatively high proportion of pigs at both Iron Age Cnip and Dun Vulan has been linked to status (Mulville 1999; Armit 2002). The high proportion of pigs at Cille Pheadair and Bornais suggests a focus on meat consumption, and may be a product of the exportation of a Norse model of farming and a process of general agricultural intensification to the Hebrides. In Arctic Norway, pigs were economically important into early modern times (Perdikaris 1999; Amundsen 2004).

Economic pig-keeping requires either substantial unmanaged woods or marshland for free-ranging pannage, or some source of feed for penned sty-kept animals (Ward and Mainland 1999). Isotopic evidence indicates a high level of variation in pig diet and management at Cille Pheadair (see section 18.4 below), and at Bornais (Jones and Mulville forthcoming), with the consumption of varying quantities of terrestrial and aquatic protein within predominantly herbivorous diets. This varied mixed diet suggests penned animals, fed on an *ad hoc* basis, with the presence of marine foods possibly linked to the increase in fishing activity: pigs could have been fed human food, human waste, fish-processing waste or bycatch.

Overall across the islands, the variation in herd composition over such a short distance suggests that there was not a single model for animal husbandry; rather, the relative proportions of species recorded for the different sites relate to local social and economic conditions as well as regional and national trends. The common strategies for animal management revealed by isotopic analysis at Bornais and Cille Pheadair do, however, suggest a similar approach to pasturing and foddering animals at these two sites.

Husbandry of the major food species

The methods of husbandry at Cille Pheadair can be compared to the published data from the Bronze Age (Cladh Hallan; Mulville and Powell in Parker Pearson *et al*. forthcoming), the Late Iron Age (Dun Vulan, Bornais Mound 1) and to the broadly contemporaneous material from Bornais (Mounds 1 and 3) and the Udal (VII-IX).

For sheep/goat, the dentition data suggest that for thousands of years the management of sheep changed very little. Data from the Bronze Age, Iron Age and the succeeding Norse periods at Cille Pheadair, Bornais and the Udal (Figure 18.10) demonstrate a slight increase over time in the number of animals surviving in later life. This indicates a less intensive exploitation of the sheep herd, with the focus shifting away from meat production possibly to secondary products with wool being increasingly important. Animals were probably farmed extensively, kept away from the settlement for the majority of the year, and slaughtered for meat on attaining full size, with fleeces taken off the older breeding females.

The dental data also indicate a decrease in cattle mortality rates over time (Figure 18.11), but this change is much more pronounced. The earlier assemblages at Bronze Age Cladh Hallan, and the combined data from the Late Iron Age sites of Dun Vulan and Bornais have a high proportion of neonatal deaths; between 60% and 72% die within the first month of life. The reasons for this high level of slaughter have been discussed elsewhere and it seems probable that it indicates milk production within a fodder-poor environment (Mulville *et al*. 2005). The Norse-period pattern of cattle management signifies a distinct break with the previous periods, with a sharp fall in neonatal cattle mortality at both Cille Pheadair and Norse Bornais. This is not true for all Western Isles Norse sites; the small sample at the Udal differs with a continuation of high levels of neonatal mortality. There is a clear focus on beef production at Cille Pheadair, with cattle slaughter rates peaking between the ages of 1–8 months and 18–30 months, although over half the population survived to adulthood at 30–36 months. This pattern is also seen at the neighbouring site of Bornais, with higher numbers of adult animals compared to previous periods.

In the Northern Isles, there was an increase in the rate of calf death in the Norse period and this has been linked to an intensification of dairy production (Mulville *et al*. 2005). On South Uist, despite the decrease in Norse-period neonatal slaughter, there is evidence for a persistent, and possibly increasing, focus on dairying. Lipid residue analysis of pottery from Bornais revealed that 35% (*n* = 11/31) of Late Iron Age lipid residues lie within the range expected for dairy fats and this increases to over 50% (*n* = 24/47) of Early to Late Norse residues (Cramp *et al*. 2014; see Chapter 22). Thus it appears that at Norse-period Bornais milk production is not directly linked to a high proportion of neonates, but rather with increasing numbers of older animals. A decrease in young calf death would lead to an increase in the size of the adult herd and both might been fuelled by an improvement in fodder provision, particularly over the winter, or in direct response to a new emphasis on the production of adult animals for meat. A focus on older cattle suggests herd conservation and an increase in herd size and may be related to working the land more intensively.

The small number of pigs on the Isles means that, for the majority of sites, little can be said about the age of pig slaughter other than general comments based on the fusion information. There is very little pig data recorded from Bornais, and the only site in the Iron Age with a useful sample of pigs is Dun Vulan. Here the majority of animals died as immature individuals, with lower numbers dying as juveniles and as adults; only a few survived into adulthood (Mulville 1999). Thus the focus on older animals in the later phases at Cille Pheadair is very different.

The different husbandry strategies for the main food

species reveal the proportion of mutton, beef and pork in the diet. As noted above, in prehistory the majority of the cattle died very young, whilst at the Norse-period sites they were generally kept to an older age before slaughter. This difference in age would affect the contribution that different species made to the diet. An adult cow would have provided about 400kg of meat, about 13 times that of an adult sheep at 30kg (Vigne 1992). However, a neonatal calf would not weigh much more than an adult sheep. Thus, in the Iron Age, the diet was probably made up of similar amounts of young beef and mutton, but in the Norse period would have been dominated by beef, given the larger carcass size of adult cattle. The small number of pigs, who mostly die young, would have contributed only a small part of the diet.

The role of minor domestic species

Goats only appear in the southern Hebrides at Cille Pheadair: none have been reported from Mound 1 or Mound 3 at nearby Bornais, and they are rare on other Scottish insular sites. The appearance of goat in Late Iron Age contexts at Bostadh is surprising, and the author notes that the identification needs to be checked, with small amounts of goat found in the Norse phases (Thoms 2003).

Given the general absence of goat, as well as notable variation in insular sheep morphology, it is possible that goat has been incorrectly reported. The identifications at Cille Pheadair are based on a series of key elements (see Methods, above), yet later attempts to retrieve goat from the assemblage, for isotopic sampling, failed to confirm these identifications. The following discussion is based upon the premise that all the elements recorded as goat have been correctly identified; caution is urged, however, in using these results.

The number of goat bones is always small, making up only 0.3% overall, reaching a maximum of 1% in phase 3 and 5, and missing from the earliest and latest phases (Table 18.9). With only 27 bones present, and these from the suite of elements for which it is possible to distinguish sheep from goat, notably horncores, it is hard to establish if goats were managed in a different manner to sheep. Elsewhere in Britain there is a general absence of goats in prehistoric and historic assemblages and, in a review of evidence for goats from central England, their presence is predominantly limited to horncores (Albarella 2003). Albarella suggests a medieval long-distance trade in goat skins, with horncores attached, and this may account for the few horncore elements identified.

The majority of recovered goat bone was fused; a single fusing pelvis and unfused calcaneum indicate the presence of younger animals, the former from an individual of about one year, and the latter from an animal under 3.5 years. This could indicate an older population but, as it is extremely difficult to identify unfused goat bones, it is likely that younger animals, if present, would not have been recognized.

Goats might have been imported for milk production. Alternatively, since goats are more effective than sheep at metabolizing twigs and leaves, their presence could suggest an attempt to exploit the meagre woodland resources on the islands. Goats are associated with the Norse in Landnám-era Iceland, where goat numbers did not decline until the early thirteenth century AD (Dugmore *et al*. 2005: 28). In Greenland goats were common and remain nearly as numerous as sheep in many assemblages down to the end of the colony in the fourteenth–fifteenth centuries AD (*cf* McGovern *et al*. 1983; 1993; 1996; Enghoff 2003).

Turning to the other domestic species at Cille Pheadair, dog and cat make up less than 1% of the assemblage. A slightly higher proportion of dogs was recovered from Norse-period Bornais Mound 3 (2% of the assemblage), but very few cats (0.3%), whilst at the Udal at this time only trace quantities of dog were recovered (Table 18.9).

Horse is present on some of the Iron Age Hebridean sites and, in the Norse period, it is present on all three South Uist sites. The proportion of horse increases to about 1% of the hand-collected assemblage at Cille Pheadair and Bornais Mound 3. Although the numbers are small, this marks the first time on South Uist that horses played a significant role. On North Uist, at the Udal, a larger number of equid bones were recovered, with horses accounting for 3% of the identified species. The presence of very young animals at Cille Pheadair, the Udal and Bornais indicates a breeding population.

Evidence of possible horse consumption on the islands is found at Cille Pheadair, where two bones are chopped in phase 6. The type and location of the butchery is ambiguous (see above) and we cannot be sure this butchery was for human consumption. Horse butchery, a chop-mark, is recorded at Late Iron Age Bornais Mound 1 (Mulville and Powell 2015: 301) and at the Udal, although the type and period to which the latter belongs is uncertain (Serjeantson 2013: 63).

Horses within Scandinavia were very important for transport and traction, and were also symbols of status, associated with religion and funerary practices. Horses were particularly associated with Odin and Freyr, with practices such as horse sacrifice, horse fights, the consumption of horse flesh and the slaughter of horses for funerals identified (Sikora 2004). A comparison of horse within funerary rites across the Viking diaspora (Scandinavia, Scotland, Ireland and Iceland) found 11 incidents of horse burial in Scotland, of which the majority came from the islands, including one from the southern Western Isle of Vatersay (Sikora *ibid*.); although this was reported, no formal records remain (Graham-Campbell and Batey 1998: 83). The presence of butchered horse in these insular locations is at odds with Pope Gregory III's AD 732 edict forbidding the consumption of horse flesh, particularly as three bone cross pendants (phase 4 and phase 7; see Chapter 13) were deposited at Cille Pheadair, indicating probably Christian beliefs.

Wild species

Wild species generally make up a small proportion of insular assemblages (1% to 15%; Table 18.9) but they

Figure 18.14. Cut-marks on the base of an unshed red deer antler (SF 1035) from context 047 (phase 8)

provided a range of essential resources. Deer are the most commonly exploited species; hare, seals, whales and dolphins are, however, also present at many Norse-period sites across the islands.

Red deer are relatively rare at Cille Pheadair overall (2% of the assemblage), with slightly increasing numbers through the phases. They are present in smaller numbers than at nearby Norse-period Bornais (5%, average of Mounds 1 and 3), which in turn saw a reduction from the higher level of Iron Age exploitation at Bornais (14%). Preliminary analysis of the body parts from both Bornais and Cille Pheadair demonstrates a range of elements, suggesting that whole animals were returned to the site. There is a small amount of red deer antler recorded, and much of this is worked (Figure 18.14), but it must be remembered that quantification at these sites does not involve the counting of every fragment of antler, as it does at some other sites. Few deer, apart from antler, were found at the Udal. At Bostadh on Lewis, however, they formed a substantial part of both Iron Age Phase 1–3 (17%) and Norse-period Phase 4 (30%) assemblages (including antler fragments).

Red deer are present in the Outer Hebrides from as early as the Neolithic (Serjeantson 1990; Mulville 2010; 2016). It is likely that deer were deliberately introduced by humans (Stanton *et al*. 2016) and might have been managed as a wild population as a fall-back food resource for times of crop failure and unexpected disease and death amongst domestic animals (Serjeantson 1990). The continued reliance on deer across Scottish islands has led many to speculate on the nature of the deer–human relationship in prehistory and beyond (Armit 2006: 237; Clutton-Brock 1979; McCormick 2006; Mulville and Thoms 2005; Mulville 2010; 2016; Noddle 1982; Sharples 2000; Stanton *et al*. 2013; Thoms 2003).

From prehistory onwards there is a persistent utilization of neonatal deer calves not seen elsewhere (Mulville 2010; 2016) and the deer assemblages at Cille Pheadair and Bornais both have neonatal red deer calves present. This may be related to an exploitation of deer calves for particular resources, *e.g.* their hides, or an attempt to manage their numbers.

For the Norse-period inhabitants, red deer would have been perceived in a number of ways – from competitors with domestic stock and consumers of crops, to valuable exploiters of less-productive land, to providers of antler – a valuable, renewable, workable resource. Cille Pheadair has a variety of antler artefacts, mostly worked tines, as well as combs (see Chapter 13) and tools that could be used in comb production (*e.g.* whale bone clamps, see Chapter 14). There is little other evidence for comb production (see Chapter 13), with the majority of combs described as imports (including a number that may be reindeer), unlike the site at Bornais where comb production has been identified (Sharples and Dennis 2016).

Small amounts of roe deer were present at Cille Pheadair; at less than 1%, they make up a only a small proportion of the assemblage; the elements present include a worked shed antler. Roe deer are recorded at four Iron Age sites in the Western Isles, but it remains unclear whether the quantities present then, or in the later Norse period, suggest an indigenous population. Indeed, there is no recorded population today, and the treeless islands would not have provided an ideal habitat (Serjeantson 1990; Corbet and Harris 1991), although contemporary herds are known from the Inner Hebrides (Bute, Islay, Seil and Skye) where the habitat is more suitable. The preferred habitat of roe deer is open mixed, coniferous or deciduous woodland. Nevertheless, they are known to occupy open moorland in some parts of mainland Scotland without access to woodland cover (Corbet and Harris *ibid*.).

There is no evidence of wild boar; these animals seem to have never established a population in the Western Isles nor to have been imported. There are no records from the Norse period of other wild species, such as badger, that are occasionally found on Iron Age sites. Hare (if correctly identified) and otter are also present at Cille Pheadair but in small numbers, suggesting that they were only used very occasionally.

The use of pinnipeds (seals) and Cetacea (dolphin and whales) continued. Early morphological analysis of the species of Cetacea at Bornais and Cille Pheadair indicates a change between prehistory and the Norse period, with a broader range of species found later (Mulville 2002). Although there are problems in both the morphological identification and quantification of whale bone, the data suggest that a greater proportion of whale bone and a larger range of artefacts are recovered from the Norse-period settlements. This could suggest a larger number of stranded animals, the more active procurement of whale, a greater length of occupation at the site or a larger settlement size. This is particularly interesting when contrasted with the Greenland Norse, who made little use of the available cetaceans. They adopted some of the native Inuit patterns of species exploitation in hunting seals but, in general, they seemed reluctant to use the marine mammals to the same degree (McGovern pers. comm.). When bone identified only to size class is included, it becomes obvious that

the large whales dominate the Norse-period whale bone assemblages (Mulville 2002).

Conclusion

The site at Cille Pheadair provides a substantive assemblage of Norse-period material. The evidence from Cille Pheadair, and the nearby site of Bornais, indicates an increasing focus on older herbivorous stock, suggesting the ability to maintain larger herds over time. Compared to other Iron Age and Norse-period sites, pigs form a higher proportion of stock, and the isotopic dietary evidence suggests these were penned animals fed forms of waste. Other domestic species include dogs and cats, with dogs playing a major role in waste management, gaining access to bone retrieved from floors and from middens. There is new emphasis on horses, with the presence of horse breeding stock, as well as the possible use of horses as food.

At Cille Pheadair wild resources formed an important addition to the diet and resources, with red deer regularly exploited for meat, and in particular for antler (see Chapter 14). Sea mammals were encountered and utilized: cetaceans provided a key material for the production of bone artefacts, and for meat and blubber.

Overall the changes seen at Norse-period Cille Pheadair are reflected elsewhere in the North Atlantic at this time, and point to shifts in the focus of farming but a continuation of previous local practices of a mixed domestic/wild economy with a greater emphasis on wild foods than found on contemporaneous mainland British sites.

18.2 The small mammals

J. Williams

Samples containing small mammal bones from Cille Pheadair were subject to basic taxonomic and taphonomic analysis. Three small mammal species were identified (field vole, house mouse and wood mouse). Analysis of bone breakage and digestion of molars and incisors indicates that the small mammals were deposited by multiple predators, which are likely to include domesticated dogs and cats, as well as an avian predator, probably an owl. Mixing of deposits containing prey remains from these predators has occurred, and there is also some evidence to suggest that a small number of bones from this site may represent natural death assemblages.

Methodology

Small mammal bones were recovered after the processing of flotation samples, from both <10mm and >10mm residues. Material was received by the author 'as sorted' from the laboratory carrying out the processing and sub-sampling, and all material made available was studied and is discussed here. Bones and teeth were examined using a Carl Zeiss binocular microscope (magnification ×8 and ×32) with bones from each sample analysed and recorded together (by context or environmental sample number). Where possible, bones were identified to element and species. Species identification was undertaken for maxillary and mandibular fragments; post-cranial elements were identified to the family level. All fragments were identified by comparison with modern material in the Sheffield University Department of Archaeology, and from dental charts (Lawrence and Brown 1967). The MNI (minimum number of individuals) was calculated for each context using the number of the most prevalent cranial element (left or right).

Small mammal accumulators

In a few, rare instances, small mammals do die and accumulate in natural or man-made holes, *i.e.* pit fall traps. However, the majority of archaeological and palaeontological deposits containing small mammal bones represent the dietary waste of predators. Careful examination of patterns of bone breakage and digestion of teeth can provide evidence of the predatory origin of deposits. Different predators have different hunting strategies which will affect the prey species composition of any small mammal deposits. These potential biases need to be taken into account when using small mammals as the basis of palaeoecological reconstruction.

Taphonomic analysis was carried out to identify how the small mammal bones were deposited on the site, and to look for signs of post-depositional bone modification that could provide information about site use and abandonment. Bone breakage and the digestion of bones and teeth were recorded following the methods set out in Andrews (1990), Fernandez-Jalvo and Andrews (1992) and further developed by Williams (2001). Additional SEM analysis was carried out on the small mammal bones from the Pictish cairn, and is described in Chapter 2.

Biogeographic considerations

A number of studies of the biogeography and evolution of island small mammals from Scottish islands have been carried out and the results from these were considered in producing a recording methodology for small mammal species at Cille Pheadair. Based on studies of cranial non-metric traits in wood mouse (*Apodemus sylvaticus*), Berry (1969) concluded that the modern Uist mice are more likely to have a common ancestor in Norway than in mainland Britain. In more recent years, it has been suggested that the issues associated with the expression of non-metric traits in island faunas may be more complex than Berry had assumed (J. Searle pers. comm.; further research on this species using DNA has been undertaken elsewhere since the completion of this report). As a result of the low recovery and high fragmentation of the skulls, it was not possible to record any of these cranial non-metric traits from the archaeological material

There are also sub-species of field vole (*Microtus agrestis*) present on specific Scottish islands (Berry 1969;

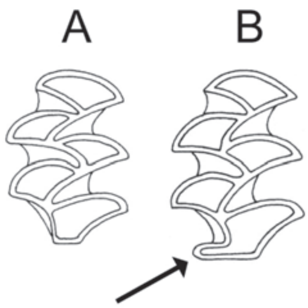

Figure 18.15. Microtus agrestis first upper molar (M^1) in simple (A) or complex form (B) with an extra postero-internal loop (image adapted from Yalden 1982: 36)

Corbet 1975; Yalden 1982; 1999). These are recognized by the presence of an additional postero-internal loop on the upper first molars (Figure 18.15). This more complex molar has been reported from field vole populations in the Outer Hebrides from North Uist, South Uist and Benbecula, as well as on other islands such as Eigg, Skye, Scalpay, Luing and Islay, and on the Scottish mainland north of the Great Glen. Corbet proposed that these voles (*Microtus agrestis 'neglectus'*) may have spread from a 'geographically separate and morphologically different parent population' (Corbet 1975: 20). As this dental variation is easily recognized, it was recorded separately from those teeth which did not express this more complex form.

Results

Basic quantitative information

In total, 638 bones were recovered from 60 contexts at Cille Pheadair, from 196 separate samples and small finds locations (although this total does not include bones recovered from the coprolites, nor those from the Pictish cairn, for which see Chapter 2). The residue after flotation for each sample was sub-sampled before sorting; only 30% of these samples were fully sorted. Table 18.11 shows the degree of sorting of the samples. This sub-sampling is a significant taphonomic bias that has an impact on our understanding of spatial patterning of the small mammal bones. It has also made it more difficult to accurately assign predatory origin to the assemblage as the number of bones is too small in many sub-samples.

Table 18.12 shows the numbers of each element recorded for all the contexts together. In some cases, numbers of elements recorded in Table 18.12 differ from those recorded from the taphonomic analysis (*i.e.* the totals recorded in Tables 18.14–18.17 for breakage and digestion). This reflects slight variations in counting and occasional lumping or splitting, particularly when bones or teeth are fragmentary. The most frequently recovered items were the vertebra and tail (caudal) bones; however, as they are naturally abundant within the skeleton, their frequency compared to other bones is fairly low.

When all of the analysed samples are lumped together, the minimum number of individuals (MNI) represented is 35 (using lower right first molars). Alternatively, when counting the most common cranial element (based on identified molar teeth) or post-cranial element (one of the principal long bones) for each context (having combined all of the different samples and species), the figure for the MNI is 105. Even by this measure, only four contexts contain five or more individuals (context 060 [*n*=7], 200 [*n*=5], 504 [*n*=5] and 544 [*n*=7]). As these samples have come from many vertically and horizontally distant locations, few interpretations can be drawn from these MNI figures, particularly given the amount of sub-sampling of the heavy residues.

Table 18.11. Small mammal samples, showing the degree to which individual samples were sorted

% of residue sorted	No. of samples	% of total number of samples
0	40	20
6	2	1
13	14	7
25	41	21
50	41	21
100	58	30

Table 18.12. Small mammal skeletal elements recovered from all contexts (excluding the Pictish cairn and the coprolite samples)

Skeletal element	*n*	Skeletal element	*n*
R mandible	26	L maxilla	11
R M1	35	L M1	18
R M2	17	L M2	7
R M3	3	L M3	5
L mandible	13	maxillary incisor	55
L M1	21	scapula	12
L M2	4	ulna	13
L M3	2	radius	9
mandibular incisor	45	humerus	36
R maxilla	17	pelvis	13
R M1	23	femur	27
R M2	11	tibia / fibula	28
R M3	6	foot bone	27
		vertebra	78
		caudal vertebra	76

Species present

Three species of small mammal have been identified from Cille Pheadair. They are wood mouse (*Apodemus sylvaticus*), house mouse (*Mus domesticus*) and field vole (*Microtus agrestis*). Based on identifiable cranial elements (mandibles, maxillae, *in situ* incisors and molar teeth), it is possible to provide a rough estimate of the proportions

Table 18.13. Numbers and percentages of teeth recovered for mice (Apodemus sylvaticus and Mus domesticus) and voles (Microtus agrestis)

Voles	**M1**	**M2**	**M3**
n	55	23	15
%	59	25	16
Mice	**M1**	**M2**	**M3**
n	42	16	1
%	71	27	2

of these species for the overall assemblage; at almost any other scale, percentage calculations would begin to become meaningless.

- There are 40 cranial elements of wood mouse, which is 18% of the sample.
- There are 72 bones and teeth of house mouse, which is 32% of those identified.
- There are 114 bones and teeth of field vole, which represents 50% of the sample. The additional postero-internal loop on the upper first molars of field vole (*i.e*. the complex '*neglectus*' condition) is present on 13 (46%) out of 28 teeth.

These figures do suggest that field voles might have been more common than mice in the local area, or were preferentially caught by predators. However, it is also possible that the isolated teeth of the voles are big enough to be get caught in a 1mm sieve, and are also more easily recognized by those sorting the samples. Analysis of the recovery of all molar teeth from the site shows that more of the larger teeth have been recovered. The third molar, which is the smallest tooth in both the voles and mice, occurs far less frequently than the first molar; only one mouse third molar is present compared with 42 first molars (Table 18.13).

Bone breakage

Bone breakage is recorded only on the post-cranial material, as there is little to be gained from recording breakage data on such a small number of mandibles and maxillae (39 and 28 respectively). Equally, the high percentage of tooth loss from the jaws, with only around 20% of molars and incisors *in situ*, suggests that breakage is quite severe. Furthermore, maxillary cranial bones are very fragile and often full analysis of their breakage is only beneficial when dealing with very large archaeological or palaeontological predator deposits that have little indication of post-depositional modification (*e.g.* trampling) or when dealing with similar modern material collected for comparative purposes.

Data for post-cranial bone breakage are shown in Table 18.14. Post-cranial bones are less susceptible to post-depositional breakage, and therefore even small numbers of bones can be usefully compared with data for avian and mammalian predators. The presence of unbroken bones

Table 18.14. Post-cranial bone breakage of small mammals from all contexts (excluding the Pictish cairn and the coprolite samples)

Humerus			**Femur**	
complete	9		complete	11
proximal	7		proximal	10
distal	18		distal	1
shaft	2		shaft	3
Total	36		Total	25
% complete	*25*		*% complete*	*44*
% proximal	*19*		*% proximal*	*40*
% distal	*50*		*% distal*	*4*
% shaft	*6*		*% shaft*	*12*
Ulna			**Tibia**	
complete	7		complete	6
proximal	6		proximal	9
distal			distal	7
shaft			shaft	5
Total	13		Total	27
% complete	*54*		*% complete*	*22*
% proximal	*46*		*% proximal*	*33*
% distal	*0*		*% distal*	*26*
% shaft	*0*		*% shaft*	*19*

in all four categories of long bone suggests that if all of these bones were deposited by a predator, the predator was not a canid (dog or fox) as previous studies have shown high bone breakage, with no complete bones surviving (Andrews 1990: 51).

This is also demonstrated in the dog and cat coprolite data from Cille Pheadair (see section 18.3), where the three humeri, one ulna and one femur recovered are all broken. On that basis, it is possible that some of the broken small mammal bones were deposited by dogs or cats, particularly given the high numbers of preserved coprolites recovered from house floors (see House 500 Stage I, Chapter 6 for example). The presence of coprolite material on bones and teeth from context 060 (sample 6385), would tend to support this. Both of the incisors from this sample are digested, as is much of the fragment of the mandible, and part of the neck of the scapula.

On the other hand, sample 7538 from context 701 contains over 40 post-cranial elements, including a complete ulna and humerus, three complete but different-sized femurs, and a complete tibia with the fragile fibula still attached. These bones are quite well preserved with the exception of faint root-marks on some of the long bones. It would seem that such a quantity of bones (for this site) in a single location would indicate a discrete burial event, and may suggest a natural death assemblage.

Table 18.15. Small mammal molar digestion (excluding the Pictish cairn and the coprolite samples)

Molar digestion	Total
In situ man molar light	5
In situ man molar moderate	6
In situ man molar heavy	1
In situ man molar extreme	
In situ man molar no digestion	18
In situ max molar light	
In situ max molar moderate	
In situ max molar heavy	
In situ max molar extreme	
In situ max molar no digestion	10
Total molars in situ	*40*
% in situ molars digested	*30*
Isolated molar light	34
Isolated molar moderate	15
Isolated molar heavy	6
Isolated molar extreme	3
Isolated molar no digestion	47
Total isolated molars	*105*
% isolated molars digested	*55*
% All molars digested	*48*
All molars light	39
All molars moderate	21
All molars heavy	7
All molars extreme	3
All molars no digestion	75
Total molars	**145**
% All molars light	*56*
% All molars moderate	*30*
% All molars heavy	*10*
% All molars extreme	*4*

Although no systematic assessment of cranial breakage was carried out for the site as a whole (for reasons given above), the incisors from sample 7538/context 701 were studied alongside the post-cranial bones, and five of the six incisors are not broken. The broken incisor has also been digested (see below) which may suggest a different predatory origin than the other bones in this particular sample.

Digestion

Digestion is recorded for the molar and incisor teeth and the results are set out in Tables 18.15–18.17. Digestion affected 48% of all molar teeth, with 30% of *in situ* molars digested, and 55% of isolated molars digested. Vole jaws more readily lose molar teeth (as they are not rooted), and only 7% of teeth are recorded *in situ* for the voles compared with 65% of all mice teeth. The variation between digestion of *in situ* and isolated molar teeth may therefore be, in part, that when teeth become separated from the protection provided by the skull, they are more likely to undergo digestion. This may be related to consumption by, and differences in feeding habits of, different predators, although much of the tooth loss may also be post-depositional (including during sample processing).

As the enamel coating on mice teeth is less susceptible to digestion, lower grades of digestion are not readily identified for mouse molars (Williams 2001). The fact that light and moderate levels of digestion have little impact on mice molars was also discussed by Fernandez-Jalvo and Andrews (1992) in their dental digestion criteria. Within the Cille Pheadair assemblage, the amount of heavy and extreme digestion recorded for the mice species is 35%, compared with only 8% for the voles, although sample sizes are low so the percentage figures seem quite large. Most of the molar digestion for the site as a whole, however, is light or moderate (86%), with only 14% of heavy or extreme digestion. Contexts with heavy or extreme molar digestion are 060, 204, 321, 554 and 584.

The results for incisor digestion are very similar to those for the molars. Digestion is recorded on 48% of all incisor teeth, which breaks down to 32% of all *in situ* incisors and 52% for all isolated teeth. There is no differentiation between species for the loss of incisors, which is common throughout the assemblage, with only 23% of all incisors still retained within the jaws, mainly in the mandibles (78% of all *in situ* incisors).

More intense digestion is also recorded for the isolated teeth, of which 6% are heavily digested, compared with none of the *in situ* teeth. As suggested above, it is likely that the more heavily digested teeth are those separated from the rest of the skull during consumption.

Moderate digestion is similar for both *in situ* and isolated teeth, about 15%. However, most of the digestion recorded for the site is light or moderate (90%), with only 10% of heavy digestion for all of the incisors. Contexts which display heavy incisor digestion are 204, 504 and 544. As a corollary to this, sample 7538 from context 701 contained six incisors (along with over 40 well preserved post-cranial bones described above). Five of these incisors are also well preserved, and only one incisor, which is also more stained than the others, is digested, and could have been intrusive when compared with the rest of the bones.

Discussion

With the exception of House 500 Stage I, the rest of the small mammal data from this site are discussed below in relation to the whole site (excluding the coprolites and context 904), rather than for particular samples or contexts. This is because the numbers of bones recovered for each sample are often too small to sub-divide much below the 'site' level. This is not necessarily a result of sub-sampling

Table 18.16. Frequency and intensity of digestion of small mammal incisors (excluding the Pictish cairn and the coprolite samples)

Incisor digestion	**Total**
In situ man incisor digested tip light	2
In situ man incisor digested tip moderate	2
In situ man incisor digested tip heavy	
In situ man incisor digested tip extreme	
In situ man incisor digested surface light	1
In situ man incisor digested surface moderate	1
In situ man incisor digested surface heavy	
In situ man incisor digested surface extreme	
In situ man incisor no digestion	9
Total mandibular incisors in situ	*15*
% in situ mandibular incisors digested	*40*
In situ max incisor digested tip light	1
In situ max incisor digested tip moderate	
In situ max incisor digested tip heavy	
In situ max incisor digested tip extreme	
In situ max incisor digested surface light	
In situ max incisor digested surface moderate	
In situ max incisor digested surface heavy	
In situ max incisor digested surface extreme	
In situ max incisor no digestion	6
Total maxillary incisors in situ	*7*
% in situ maxillary incisors digested	*14*
% total in situ incisors digested	*32*
Isolated lower incisor digested tip light	6
Isolated lower incisor digested tip moderate	4
Isolated lower incisor digested tip heavy	2
Isolated lower incisor digested tip extreme	
Isolated lower incisor digested surface light	4
Isolated lower incisor digested surface moderate	
Isolated lower incisor digested surface heavy	1
Isolated lower incisor digested surface extreme	
Isolated lower incisor no digestion	13
Total isolated lower incisors	*30*
% isolated lower incisors digested	*57*
Isolated upper incisor digested tip light	8
Isolated upper incisor digested tip moderate	8
Isolated upper incisor digested tip heavy	1
Isolated upper incisor digested tip extreme	
Isolated upper incisor digested surface light	5
Isolated upper incisor digested surface moderate	1
Isolated upper incisor digested surface heavy	1
Isolated upper incisor digested surface extreme	
Isolated upper incisor no digestion	25
Total isolated upper incisors	*49*
% isolated upper incisors digested	*49*
% Total lower incisors digested	*51*
% Total upper incisors digested	*45*
% Total incisors digested	*48*

at the processing stage, but reflects a genuinely low number of bones on site.

Predatory origin

Some of the small mammal bones at Cille Pheadair occur in discrete collections that could represent either natural death assemblages (*e.g.* see Figure 5.15, which shows articulated skeletons in House 700), or a single or small group of coprolites or pellets (Figure 18.16). A 'natural death scenario' is unlikely as most contexts contain some teeth with signs of digestion. In fact, very few contexts containing more than two teeth have no evidence of digestion, with the exception of 063, 554, 555 and 596. In some cases, the presence of digested and undigested bones in the same context could be an indication of mixing of material from different depositional events, a result of the constant re-working of the site during different phases of construction. For example, context 701 (the floor of House 700 in phase 3; Table 18.18) contains 98 bones and teeth, of which only one shows any signs of digestion. In appearance this one incisor is slightly more orange than the others in the deposit, which look almost fresh. It is therefore likely that floor 701 does contain some small mammals that have died of natural causes.

Figure 18.16. A modern-day owl pellet

Table 18.17. Location and intensity of digestion of small mammal incisors

Location of digestion	Total
Incisors digested tip light	17
Incisors digested tip moderate	14
Incisors digested tip heavy	3
Incisors digested tip extreme	0
Incisors digested surface light	10
Incisors digested surface moderate	2
Incisors digested surface heavy	2
Incisors digested surface extreme	0
Incisors no digestion	53
Total incisors	*101*
% incisors digested tip light	35
% incisors digested tip moderate	29
% incisors digested tip heavy	6
% incisors digested tip extreme	0
% incisors digested surface light	21
% incisors digested surface moderate	4
% incisors digested surface heavy	4
% incisors digested surface extreme	0

Table 18.18. Locations of small mammal remains from the floor of House 700

Easting	Northing	Remains
7.25	107.25	skeleton
7.25	109.75	bone(s)
7.25	110.25	bone(s)
7.75	105.25	bone(s)
7.75	106.75	bone(s)
7.75	107.75	bone(s)
8.25	105.25	bone(s)
8.25	107.25	bone(s)
8.75	109.25	bone(s)
9.25	109.25	bone(s)
9.75	102.75	skeleton
9.75	103.75	bone(s)
9.75	104.75	bone(s)
9.75	109.25	bone(s)
10.25	103.75	bone(s)
10.25	104.25	bone(s)
10.75	102.75	bone(s)

For the rest of the site, however, the evidence of digestion recorded in many of the samples suggests that the majority of the small mammals recovered from Cille Pheadair have a predatory origin. One predator responsible for the assemblages may be the dogs. The analysis of the coprolites from this site indicates that both dogs and cats were consuming (and depositing) small mammal bones. However, the severity of digestion recorded on the small mammal teeth from the coprolites (see section 18.3) is of a greater intensity than that recovered for most of the assemblage: 90% of all digested teeth were heavily or extremely digested in the coprolite samples, compared with only 14% from the rest of the samples.

Some of the digested small mammal teeth may therefore have come from coprolites (buried in certain parts of the site, or moved around the settlement on the bottom of shoes and hooves). This is confirmed by the presence of a deposit adhering to the bones from context 060 sample 6385, for example, which looks like the coprolite material. However, in the limited sample of coprolites studied (see section 18.3), only two of the six contained small mammal bones. Additionally, the survival of many whole coprolites suggests that they (and any bones they contain) are not all becoming incorporated into the deposits. Since there is so much light and moderate digestion recorded for the site, it is therefore likely that other depositional agents were involved in the accumulation of most of the small mammal bones.

When compared with taphonomic data recorded for present-day predators, the characteristics of the Cille Pheadair assemblage most closely match avian predators, such as owls. For example, the low intensity of digestion (*i.e.* light rather than extreme), and the survival of long bones in more or less whole condition, is more typical of owls rather than mammalian carnivores (which would have a more damaging effect on the bones and teeth). The frequency of digestion, however, is much higher on this site than has been recorded in previous predator studies for almost all of the owl species present in the UK today (*e.g.* Andrews 1990).

Undoubtedly, the admixture of dog coprolite material will skew these data somewhat, but is unlikely to have made a significant contribution to the overall assemblage. The only owl species in the UK which has a similar taphonomic signature is the tawny owl (*Strix aluco*). Tawny owls will nest in buildings and take a wide prey range, including birds, mammals and invertebrates (Yalden 1985; Andrews 1990) and whilst it is not currently recorded in the Outer Hebrides, it does occur in highland Scotland.

Although the frequency of digestion recorded on the small mammal bones from Cille Pheadair is higher than previous data for the tawny owl, differences may be exacerbated by the small amount of material from this site, as well as the variability in sub-sample processing. An additional explanation may be that these small mammal deposits represent owl nest rather than owl roost material, as digestion rates from owl nest sites have been shown to be higher than rates from roost sites (Williams 2001 – data for barn owls).

Material from House 500 Stage I in particular may relate to nesting by owls during a phase of abandonment of the settlement. In this building, the small mammal bones were distributed across the floor surface with a slightly greater concentration at the north end of the house (Figure

Figure 18.17. Distribution of small mammal bones on the floor of House 500 (phase 4)

18.17). In this building, 143 small mammal bones were recovered from 55 samples across three contexts (504, 544 and 548). The recovery of material was low and no sample contained more than 10 bones; 45 of the samples contained three bones or fewer. There is an area towards the southwest corner where few bones are distributed, perhaps suggesting this part of the floor was cleaned when the house was re-occupied.

Distributions of small mammal bones in the house floors of each phase are discussed in the relevant chapters. The figures showing the distribution plots of small mammal bones in the floors are:

- phase 3 House 700: Figures 5.15–5.16 (and Table 18.18),
- phase 8 House 007: Figure 10.19,
- phase 9 Hut 026: Figure 11.16.

Species present: biogeography and past environments

Three species of small mammal are recorded on South Uist by Yalden (1982; 1999: tab. 8.3), the field vole, wood mouse and pygmy shrew. All of these have been introduced to the island at some point in the past, along with traditional commensal species, the house mouse and rat (*Rattus* sp.); a fairly recent whole skull of the latter was recovered at the site of Dun Vulan. The pygmy shrew only occurs in small quantities (in frequency and particularly in terms of prey weight) in most owl diets (Glue 1970; 1974; Yalden 1985) and thus the Cille Pheadair assemblage may just be too small to reveal its presence.

Previous analysis by Williams (2001: 236–7) of 11 separate contexts demonstrated a slight correlation between sample size and species richness [$r = .487$, $p = .129$], and Andrews suggests that the relationship between sample size and species richness is exponential rather than a straight line and, in general, samples containing over 100 individuals usually have reached a species richness plateau (Andrews pers. comm.). It is, however, possible that the pygmy shrew was not introduced to the island until after the Cille Pheadair assemblage was accumulated.

The recovery of molars of the field vole sub-species *Microtus agrestis 'neglectus'* on South Uist is in keeping with results from modern material discussed by Yalden (1982). However, the pattern of distribution of this dental variation appears to be more complex than was reported at the time: recently *Microtus agrestis 'neglectus'* has been found to be living in areas where it was not previously recorded, such as south of the Great Glen on the Scottish mainland (J. Herman pers. comm.).

Given the multiple predatory origin of the archaeological deposits, it is likely that the prey range recorded at Cille Pheadair is an accurate reflection of the species present in the local environment at the time. The house mouse is often found in and around human settlement. The wood mouse is also found in association with settlements, but usually favours hedgerows and wooded environments. Field voles inhabit rough grassland environments and their occurrence in the Cille Pheadair assemblage is therefore indicative of areas of grassland in the area around the settlement.

18.3 The coprolites

J. Williams and C. Ingrem

Small mammal remains from canid coprolites

J. Williams

A small sample of the coprolites from Cille Pheadair was analysed to identify any animal bones, pollen or parasites within them. Although a large number of well preserved coprolites were recovered from this site, the conditions were not conducive to the preservation of parasites or pollen. However, a number of coprolites were found to contain bones of small mammals, which are further discussed below. Taxonomic and taphonomic analysis was carried out, and consideration was also given to the relationship between small mammal bones recovered from these coprolites and those collected during excavation and environmental sampling.

Table 18.19. Contexts from which coprolites evaluated for parasites were sampled

Sample	Context/ environmental sample number	Context type	Total no. of fragments	Weight of sampled fragment (g)
A	600		3	1.99
B	504 / 7188	floor	11	1.66
C	321		1	1.41
D	582		1	1.45
E	504 / 7197	floor	6	1.99
F	733		1	0.67

Methodology

Six fragmentary coprolites from different contexts were randomly sampled to evaluate the survival of parasites. As the coprolites were very firm, they were first soaked in a 5% solution of tetra-sodium pyrophosphate ($Na_4P_2O_7.10H_2O$) to aid disarticulation. This was spectacularly unsuccessful owing to the state of fossilization of the coprolites. The re-dried coprolites were therefore then manually separated and the material placed in test tubes. These were filled with a concentrated salt solution and the resulting suspension thoroughly mixed. The test tubes were filled to the brim and a cover slide placed over the top so that the solution was in contact with the cover slip. After 20 minutes the cover slips were transferred to microscope slides and examined at a range of magnifications (Tritschler and LeaMaster 1998). No parasites were recovered during this investigation. Further analysis using more advanced pollen preparation techniques also failed to provide positive results (Rob Craigie pers. comm.). Table 18.19 lists the contexts from which these coprolites were sampled, the number of fragments in the context, and their weight.

Two of the sampled coprolites did contain fragments of bone. Sample F contained unidentifiable broken bone fragments, whilst sample A contained a number of identifiable small mammal teeth. Parasite sampling was discontinued, and the study re-focused on the retrieval of small mammal bones.

Table 18.20. Contexts sampled for coprolites containing small mammal bones

Context	Sample number	Context type	Length (mm)	Breadth (mm)	Width (mm)	Weight (g)	Weight of residue (g)	Weight of small mammal bones (g)
600	–		1.3	0.8	0.6	0.3		
			1.8	1.3	0.4	0.4		
			–	–	–	1.3	no residue	less than 0.1
504	7174	floor	2.7	2.2	1.9	4.4	2.6	no small mammals
308	–		4.3	2.7	2.7	12.3	8.6	no small mammals
507	–		1.6	2.9	2.4	4.4	2.3	no small mammals
624	–		1.9	1.1	0.8	1		
			1.8	1.3	1.3	1		
			1.5	1.1	1.1	0.8	0.5	0.1
144	–		4	2.6	2.2	9.8		
			2.4	2	1.1	1.7		
			1.6	1.2	1.1	0.6		
			1.1	0.9	0.7	0.2	6.8	no small mammals
544	7174	floor	3.1	2.1	1.9	6.5	5.5	0.1
128	–		3	2.3	2.3	7.8		
			2.6	2.5	2.1	6		
			–	–	–	3.3	14.3	0.1
Total						61.8	40.6	0.3

A further sample of coprolites was selected, focusing on any with identifiable small mammal bones visible on the surface, and on coprolites recovered from house floors. Three small coprolites from context 624 were sampled as their narrow diameters (45mm) indicated that they were probably feline in origin (Mike Parker Pearson pers. comm.). Larger samples were taken and, as this was a destructive process, each coprolite was measured and weighed before disarticulation. The best preserved and most morphologically distinct 'whole' coprolites were not sampled, so that they remain available if new research methods develop in the future.

The sampled coprolites were subjected to a range of methods aimed at removing the bones from the fossilized matrix with the minimum of damage, to ensure accurate taphonomic analysis and to give the best chance for identification. Coprolites were initially soaked in water, which had little effect. They were then soaked in a 2% solution of acetic acid, as it was considered that this could help break down any carbonate solutes that formed the fossil matrix. This was also a fairly unsuccessful method. Finally, the coprolites were placed (in beakers of water) in a high-frequency sonic bath for 15 minutes. The suspended solution was then washed in a 0.3mm mesh sieve, and the residue laid out on paper towels to dry. The dry residue was then hand-sorted. All bones and bone fragments were retrieved and both the bones and the residue were individually weighed. The results of this initial quantification are shown in Table 18.20.

The retrieved small mammal bones were examined using a Carl Zeiss binocular microscope (magnification ×8 and ×32), with bones from each sample (context or environmental sample) analysed and recorded together. Where possible, bones were identified to element and species. Species identification was undertaken for maxillary and mandibular fragments; post-cranial elements were identified to the family level. All fragments were identified by comparison with modern material in the Sheffield University Department of Archaeology and Prehistory, and from dental charts (Lawrence and Brown 1967). The MNI (minimum number of individuals) was calculated for each context using the number of the most prevalent mandibles (left or right). Taphonomic analysis was also carried out, noting bone breakage and digestion of bones and teeth, following guidelines in Andrews (1990), Fernandez-Jalvo and Andrews (1992) and further developed by Williams (2001).

Results

A total of 17 coprolites, weighing 61.8g, were investigated for the presence of small mammal remains. These derived from eight separate contexts. Three contexts contained small mammal bones. Three contexts (128, 144 and 624) contained fish bone, discussed below.

Three species of small mammal were recovered,

Table 18.21. Small mammal bones recovered from coprolites, identified to species

CONTEXT	**600**	**600**	**600**	**600**	**544**	**544**	**624**	**624**	**624**	**624**	**Total**
Sample no.					7174	7174					
Species	*R*	*M. a*	*M sp.*	*A. s*	*R*	*M. a*	*R*	*A. s*	*M. d*	*M sp.*	*All*
No. of bones	16	1	4	11	3	1	11	4	1	1	53
MNI		1	1	2		1		1	1	1	8
R mandible			1	1							2
R M1				1							1
R M2				1							1
R M3		1									1
L mandible			1					1			2
L M1			1	1				1	1		4
L M2				2							2
L M3											
incisor	2		1				1				4
R maxilla											
R M1				2							2
R M2						1		1		1	3
R M3											
L maxilla											
L M1				1							1
L M2											
L M3				2				1			3
incisor	5						2				7
scapula											
ulna					1						1
radius					2		1				3
humerus	2						1				3
pelvis											
femur	1										1
tibia											
fibula											
vertebra							1				1
caudal vertebra	6						5				11

(*M. a* = *Microtus agrestis*, *A. s* = *Apodemus sylvaticus*, *M. d* = *Mus domesticus*, *M sp.* = only identifiable to murine, and *R* = only identifiable to Rodentia)

field vole (*Microtus agrestis*), wood mouse (*Apodemus sylvaticus*) and house mouse (*Mus domesticus*), which are discussed in section 18.2, above. A total of 53 small mammal bones were recovered, representing a minimum number of individuals (MNI) of eight. The MNI was calculated from the teeth for each species from each context. Cranial bones (teeth and mandibles) total 33 bones, with a further 20 post-cranial bones also recorded. Of the post-cranial bones, 12 are vertebrae and caudal vertebrae, while the remaining eight are long bones (humerus, radius, ulna and femur; Table 18.21).

An analysis of bone breakage was carried out on the long bones (ulna, humerus, femur and tibia). Breakage was high on these bones, with no complete bones recorded (Table 18.22). One complete radius was recovered from context 600. The high level of breakage is consistent with canid (and felid) data collected by Andrews and Evans (1983) and Andrews (1990).

Table 18.22. Bone breakage for small mammal ulna, humerus and femur within coprolites

Context	600	544	624	Total
Sample		7174		
Humerus				
complete				
proximal				
distal	1		1	2
shaft	1			1
Total	2		1	3
Ulna				
complete				
proximal		1		1
distal				
shaft				
Total		1		1
Femur				
complete				
proximal	1			1
distal				
shaft				
Total	1			1

Digestion of teeth was also recorded and has been tabulated for the molar teeth (Table 18.23). Only four incisor teeth were recovered, of which three were digested, two heavily and one moderately. Similar levels of digestion were recorded for the molar teeth, with 65% (12 out of 18) of all molar teeth digested. In most of these cases this digestion was heavy or extreme. The results are comparable with those recorded by Andrews (1990) for red fox (*Vulpes vulpes*), and with dogs and cats in general, which are recognized as predators that produce high levels of bone modification and digestion on small mammal bones.

Discussion

It is disappointing that no evidence of parasites or pollen survived in the coprolites from this site, as the potential indicators of both animal and human diet attainable from them could have provided insight into the lives of those living at Cille Pheadair. However, the recovery of small mammal bones from some of these coprolites does raise interesting questions.

It certainly suggests that dogs at this site did not have all of their diet provided by their owners. Potentially this is an indication of the harshness of the climate and environment, and the lack of available food for these animals. The recovery of small mammal bones from possible cat coprolites is more in keeping with our preconceptions as to the behaviour of this species, and it may be that both the cats and dogs at this site were, in part, kept for pest control. The discovery of two well preserved and partially articulated mice on the floor of House 700 (see Figure 5.15) demonstrates that small mammals were certainly present within the settlement.

One of the key conclusions from the study of the coprolites is the difference in bone modifications between the coprolite evidence and the majority of the small mammal bones collected during excavation. Given the higher levels of breakage and digestion, and the relatively low numbers of small mammal bones from the coprolites, it is unlikely that the dogs and cats at this site were the principal accumulators of the rest of the small mammal deposits. However, it is necessary to consider their role when assessing the taphonomic characteristics of the microfauna deposits at Cille Pheadair, and to be aware of any potential bias that may occur in future interpretations as a result of the multiple predatory origin of some of the deposits.

Fish remains from canid coprolites

C. Ingrem

Fish bones recovered from the sampled coprolites were identified in an attempt to discover whether or not the feeding of fish waste to dogs, in particular herring heads, could account for the low representation of cranial bones in the main assemblage of fish remains recovered from Cille Pheadair.

As shown in Table 18.24, a limited range of species are represented in the coprolites with only herring *(Clupea harengus)* and saithe *(Pollachius virens)* identified to species. Saithe bones are the most numerous, but their high frequency is due to their abundant presence in one coprolite (context 144) and saithe is absent from other contexts.

The majority of the anatomical elements present are vertebrae, with only three cranial bones belonging to saithe and one appendicular element belonging to a gadoid fish present (Table 18.25). A consideration of the anatomical representation of saithe in context 144 (Table 18.26) indicates that at least two individual fish were consumed by one dog and the presence of cranial and vertebral bones suggests that at least one of these may have been whole.

The sample of fish bones recovered from the coprolites is small but the presence of herring vertebrae in the majority of samples suggests they were the fish most often eaten by dogs; this is unsurprising given the predominance of herring in the main assemblage. Given the fragility of cranial bones compared to the more robust vertebrae, it is unlikely that cranial bones would survive the digestive process as well as vertebrae, and this may account for their absence in the small herring sample.

The surviving saithe bones appear to result from the

Table 18.23. Digestion of small mammal molars from coprolites

Context	**600**	**600**	**600**	**544**	**624**	**624**	**624**	**624**	**Total**
Sample				7174					
in situ mandibular molars digested			2						2
man molar light									
man molar moderate									
man molar heavy									
man molar extreme			2						2
man molar no digestion						1			1
in situ maxillary molars digested		1							1
max molar light									
max molar moderate									
max molar heavy									
max molar extreme		1							1
max molar no digestion									
Total maxillary and mandibular molars		1	2			1			4
isolated molars digested	1		5	1				1	8
isolated molar light				1					1
isolated molar moderate									
isolated molar heavy	1		4						5
isolated molar extreme			1					1	2
isolated molar no digestion			2			2	1		5
Total isolated molars	1		7	1		2	1	1	13
All molars light				1					1
All molars moderate									
All molars heavy	1		4						5
All molars extreme	1		4	1					6
All molars no digestion			2			3	1		6
Total molars	2		10	2		3	1		18

Table 18.24. Fish species within coprolites according to context (NISP)

Species	**128**	**133**	**144**	**534**	**544**	**624**	**Total**
Clupea harengus	1	6		4		1	12
Pollachius virens			48				48
Gadidae			4				4
Unidentifiable					1		1
Total	**1**	**6**	**52**	**4**	**1**	**1**	**65**

consumption of at least two whole fish, with cranial bones comprising just 6% of the assemblage. If a similar situation is envisaged for herring, the expected number of surviving elements would not amount to even a single fish. However, if herring heads were preferentially fed to dogs, rather than whole fish, some evidence of cranial bones would be expected. In the light of this, the limited evidence provided by the fish bone recovered from canid coprolites cannot be used to suggest that herring heads were routinely fed to dogs.

Table 18.25. Anatomical elements of fish within coprolites (NISP)

Element	*Clupea harengus*	*Pollachius virens*	Gadidae	Total
Premaxilla		1		1
Maxilla		1		1
Articular		1		1
Supracleithrum			1	1
Basiooccipital			1	1
Anterior abdominal vertebrae	3	9	2	14
Caudal vertebrae	3	13		16
Posterior abdominal vertebrae	5	11		16
Vertebral fragment	1	12		13
Total	**12**	**48**	**4**	**64**

Table 18.26. Species and anatomical representation of fish in the coprolite from context 144

Element	*Pollachius virens*	Gadidae	Total
Premaxilla	1		1
Maxilla	1		1
Articular	1		1
Supracleithrum		1	1
Basiooccipital		1	1
Anterior abdominal vertebrae	9	2	11
Posterior abdominal vertebrae	11		11
Caudal vertebrae	13		13
Vertebral fragment	12		12
Total	**48**	**4**	**52**

18.4 Bone collagen stable isotope analysis

J.R. Jones and J. Mulville

Introduction

Bone collagen stable isotope analysis ($\delta^{13}C$ and $\delta^{15}N$) was originally recognized as a valuable technique for understanding past human diets (Chisholm *et al.* 1982; Schoeninger *et al.* 1983; Schoeninger and DeNiro 1984). The technique works on the principle that dietary carbon and nitrogen is used by the body for growth and repair, and, subsequently, the stable isotope ratios of carbon (^{13}C:^{12}C) and nitrogen (^{15}N:^{14}N) provide direct evidence of long-term or average diet consumed by individuals over the last 10–15 years of life (Chisholm *et al.* 1982; Lovell 1986).

The technique can also be applied to animals to explore landscape use in the management of animals (Stevens *et al.* 2013; 2010; Madgwick *et al.* 2012a) and the use of coastal pastures, identifiable on a population level and within individuals (Müldner *et al.* 2014; Jones *et al.* 2012; Jones and Mulville 2016).

Bone collagen stable isotope analysis ($\delta^{13}C$ and $\delta^{15}N$) was undertaken on faunal specimens from Cille Pheadair to provide insights into animal management at the site, specifically to explore the importance of marine and shorefront resources, and to understand the use of the wider landscape. Red deer were analyzed to explore the impact of Norse settlers on the niche of the species, and the potential impact of both the human population and the deer population on the natural environments of the island. Comparisons are drawn to similar work completed at the nearby site of Bornais to explore whether similar animal management strategies were used at these two settlements.

A series of bird specimens excavated from Cille Pheadair was analyzed to provide initial insights into the ecologies of these species during the Norse period. Two seal bones were also sampled to provide a marine baseline.

Sample selection and methodology

In total, collagen extraction was attempted on 30 mammalian bone specimens; 27 of these yielded usable collagen for analysis (five cattle, eight pig, seven sheep and seven red deer). The majority of the mammalian species (n=22) derived from phase 5 contexts, with an additional three specimens from phase 3, and one specimen each from phases 4 and 6, which all date to between *cal AD 1030–1095* (start of phase 3) and *cal AD 1105–1160* (start of phase 7).

A total of 16 bird bones deriving from phases 2–7 were sampled, with 15 yielding sufficient collagen for analysis. A further two seal bones from phase 5 were also sampled. A list of the samples taken and their phasing information is included in Table 18.27.

Mature animal specimens, as determined from epiphyseal fusion and surface texture (Silver 1969), were selected for analysis to avoid nursing signatures as these can cause inflated $\delta^{15}N$ values (Schurr 1997; 1998). Different individuals were targeted by sampling the same skeletal elements from the same side of the body. Collagen-rich

Table 18.27. Full data-set of animal bone samples and their stable isotope values

Sample number	Species	Context	Phase	$\delta^{13}C$	$\delta^{15}N$	%C	%N	C:N
KIL01	Cattle	010	5	-21.3	4.1	39.9	13.6	3.4
KIL02	Cattle	010	5	-21.6	4.5	26.4	8.7	3.6
KIL03	Cattle	533	5	-21.2	5.8	39.5	13.8	3.4
KIL04	*Cattle*	*422*	*4*	*Failed*	*Failed*	*Failed*	*Failed*	*Failed*
KIL05	Cattle	010	5	-22.0	5.2	16.7	5.2	3.6
KIL06	Cattle	308	5	-21.5	3.7	26.9	9.0	3.6
KIL07	Sheep	308	5	-21.5	5.7	42.4	13.9	3.6
KIL08	Sheep	351	5	-21.6	3.8	18.1	5.7	3.5
KIL09	Sheep	528	3	-21.1	5.2	44.0	15.5	3.3
KIL10	Pig	351	5	-17.8	11.3	26.0	8.3	3.6
KIL11	Red Deer	010	5	-21.9	5.7	41.3	13.9	3.5
KIL12	Red Deer	522	5	-22.1	4.0	28.8	9.2	3.6
KIL13	Seal	010	5	-12.3	18.1	34.68	11.55	3.50
KIL14	Sheep	010	5	-21.8	6.0	45.5	15.3	3.5
KIL15	Sheep	367	6	-21.3	4.6	39.3	13.0	3.5
KIL16	Pig	420	5	-20.4	7.3	32.6	10.6	3.6
KIL17	*Cattle*	367	6	*Failed*	*Failed*	*Failed*	*Failed*	*Failed*
KIL18	Sheep	023	5	-21.7	5.7	47.4	16.2	3.4
KIL19	Pig	317	4	-21.0	7.9	43.7	14.7	3.5
KIL20	Red Deer	308	5	-21.9	6.9	50.8	17.4	3.4
KIL21	Pig	507	5	-20.6	7.4	50.7	17.4	3.4
KIL22	Sheep	528	3	-21.4	6.2	43.3	15.3	3.3
KIL23	Red Deer	118	5	-22.0	4.4	50.2	16.6	3.5
KIL24	Pig	118	5	-21.7	4.8	38.4	13.2	3.4
KIL25	Pig	534	5	-18.8	9.8	44.5	15.4	3.4
KIL26	Seal	507	5	-12.6	16.1	45.2	15.7	3.4
KIL27	*Pig*	*317*	*4*	*Failed*	*Failed*	*Failed*	*Failed*	*Failed*
KIL28	Red Deer	515	5	-21.8	5.5	35.1	11.7	3.5
KIL29	Red Deer	528	3	-21.6	6.0	45.5	15.7	3.4
KIL30	Red Deer	010	5	-21.6	6.0	43.6	14.7	3.4
KIL31	Pig	010	5	-19.1	8.7	37.6	12.7	3.5
KIL32	Pig	010	5	-21.9	6.9	40.6	13.4	3.5
KIL33	Gannet	528	3	-14.82	14.1	50.6	17.5	3.4
KIL34	Gannet	135	4	-14.16	12.8	42.0	14.5	3.4
KIL35	Gannet	457	2	-13.96	15.0	40.0	14.3	3.3
KIL36	Fulmar	371	4	-16	16.2	50.1	17.5	3.3
KIL37	*Fulmar*	*372*	*7*	*Failed*	*Failed*	*Failed*	*Failed*	Failed
KIL38	Cormorant	330	7	-12.21	15.1	47.2	17.1	3.2
KIL39	Cormorant	394	6	-12.88	15.8	54.5	19.8	3.2
KIL40	Great Black-Backed Gull	555	4	-14.05	14.8	45.6	16.4	3.3
KIL41	Great Black-Backed Gull	553	4	-14.9	15.8	47.3	16.7	3.3
KIL42	Guillemot	546	5	-15.13	15.5	65.6	23.0	3.3
KIL43	Guillemot	701	3	-15.33	15.0	57.2	20.4	3.3
KIL44	Shag	422	4	-14.22	15.8	44.2	15.7	3.3
KIL45	Shag	316	7	-15.03	16.3	44.9	15.7	3.3
KIL46	Large Grey Goose	010	5	-20.38	6.7	48.3	16.6	3.4
KIL47	Large Grey Goose	600	2	-22.87	9.5	48.1	16.5	3.4
KIL48	Large Grey Goose	573	2	-22.15	9.6	41.7	14.5	3.3

Table 18.28. Summary statistics by phase of the isotopic analysis of animal bones from Cille Pheadair, showing results from the analysis of samples from Bornais as a comparison

Site	Phase	Species	*n=*	$\delta^{13}C$ ‰				$\delta^{15}N$ ‰			
				Mean	**Min**	**Max**	**1σ std.**	**Mean**	**Min**	**Max**	**1σ std.**
Cille Pheadair	phase 5	cattle	5	**-21.5**	-22.0	-21.2	0.3	**4.6**	3.7	5.8	0.9
		sheep	4	**-21.6**	-21.8	-21.5	0.2	**5.3**	3.8	6	1
		pig	7	**-20.0**	-21.9	-17.8	1.5	**8.0**	4.8	11.3	2.1
		red deer	6	**-21.9**	-22.1	-21.6	0.2	**5.4**	4	6.9	1.1
	phase 3	sheep	2	**-21.3**	-21.1	-21.4	–	**5.7**	5.2	6.2	–
		red deer	1	**-21.6**	–	–	–	**6.0**	–	–	–
	phase 4	pig	1	**-21.0**	–	–	–	**7.9**	–	–	–
	phase 6	sheep	1	**-21.3**	–	–	–	**4.6**	–	–	–
Bornais	Early Norse	cattle	6	**-21.7**	-22.7	-20.9	0.5	**4.6**	3.7	5.3	0.5
		sheep	3	**-21.3**	-21.7	-21.1	0.3	**5.3**	4.8	6.12	0.7
		pig	4	**-19.6**	-21.5	-17.6	1.6	**9.4**	6.1	11.4	2.3
		red deer	10	**-21.6**	-22	-21.2	0.2	**5.1**	4.3	6.1	0.6
	Middle Norse	cattle	9	**-21.3**	-21.8	-20.8	0.4	**6.4**	4.2	9.6	2.2
		sheep	4	**-21.3**	-21.8	-20.5	0.5	**4.9**	3.4	6.0	1.2
		pig	1	**-20.4**	–	–	–	**7.8**	–	–	–
		red deer	4	**-21.6**	-21.8	-21.4	0.2	**5.7**	4.9	6.6	0.7
	Late Norse	cattle	9	**-21.4**	-22	-21	0.3	**4.9**	4.2	5.8	0.6
		sheep	5	**-21.5**	-21.6	-21.35	0.1	**4.8**	4.24	5.3	0.4
		pig	6	**-20.5**	-21.5	-19.3	0.8	**7.9**	7.1	8.9	0.8
		red deer	3	**-21.6**	-21.8	-21.5	0.1	**5.1**	4.8	5.4	0.3

long bones such as the tibia, femur, radius and humerus were targeted.

The collagen from the bone samples was extracted at the Cardiff University Bioarchaeology Laboratory following a modified Longin method (Longin 1971; Collins and Galley 1998). Bone fragments weighing between 0.7–0.9g were drilled and cleaned using aluminium oxide air abrasion. Samples were demineralized in 0.5 M HCL at 6–8°C for between 3 and 10 days. Specimens were washed three times using de-ionized water before being gelatinized in a weak acidic solution (pH 3 HCL) at 70°C for 48 hours. Samples were filtered using 5–8 µm biological filters (Evergreen Scientific, California, USA).

Isotopic analysis of specimens was funded by and undertaken at the NERC Life Sciences Mass Spectrometry Facility in East Kilbride, UK. The extracted collagen was combusted using an ECS 4010 elemental analyser (Costech, Milan, Italy), coupled to a Delta V Plus isotope ratio mass spectrometer (Thermo Scientific, Bremen, Germany).

The $\delta^{13}C$ values and $\delta^{15}N$ values are reported relative to the V-PDB and AIR standards. Based on replicate analysis of in-house laboratory standards, analytical error was 0.1‰ for $\delta^{13}C$ and 0.2‰ for $\delta^{15}N$ (σ1). Mann–Whitney U test was used for statistical analysis, with a post-hoc Holm–Bonferroni correction (Holm 1979) using the ecological statistical programme 'PAST' (Hammer *et al*. 2001). A *p*-value of .05 or less was deemed to be indicative of a statistically significant result.

Results and interpretation

The values of sheep and cattle occupy similar ranges in $\delta^{13}C$ values (cattle: -22.0‰ to -21.2‰; sheep: -21.8‰ to -21.1‰), and $\delta^{15}N$ values (cattle: 3.7‰ to 5.8‰; sheep: 3.8‰ to 6.2‰; Table 18.28). There is no statistically significant difference in the cattle or sheep populations in the $\delta^{13}C$ ($p = .39$) or $\delta^{15}N$ ($p = .39$) values observed. These values are indistinguishable from those seen at nearby Bornais (Table 18.28).

The red deer values are similar to the domestic herbivores, although they exhibit slightly lower $\delta^{13}C$ values ranging between -22.1‰ and -21.6‰. No statistically significant difference was observed between the red deer $\delta^{13}C$ and cattle ($p = .08$) populations. A difference was observed between the sheep and the red deer ($p = .01$), with red deer typically having lower $\delta^{13}C$ values. No difference in $\delta^{15}N$ was observed between red deer and any of the herbivores analysed (with sheep $p = .70$ and with cattle $p = .32$).

Amongst the pigs, three samples have elevated $\delta^{15}N$ values indicative of higher levels of protein consumption (Figure 18.18), and in this are similar to some of the individuals from Bornais (Table 18.28). A further two individuals had lower $\delta^{15}N$ values associated with a diet

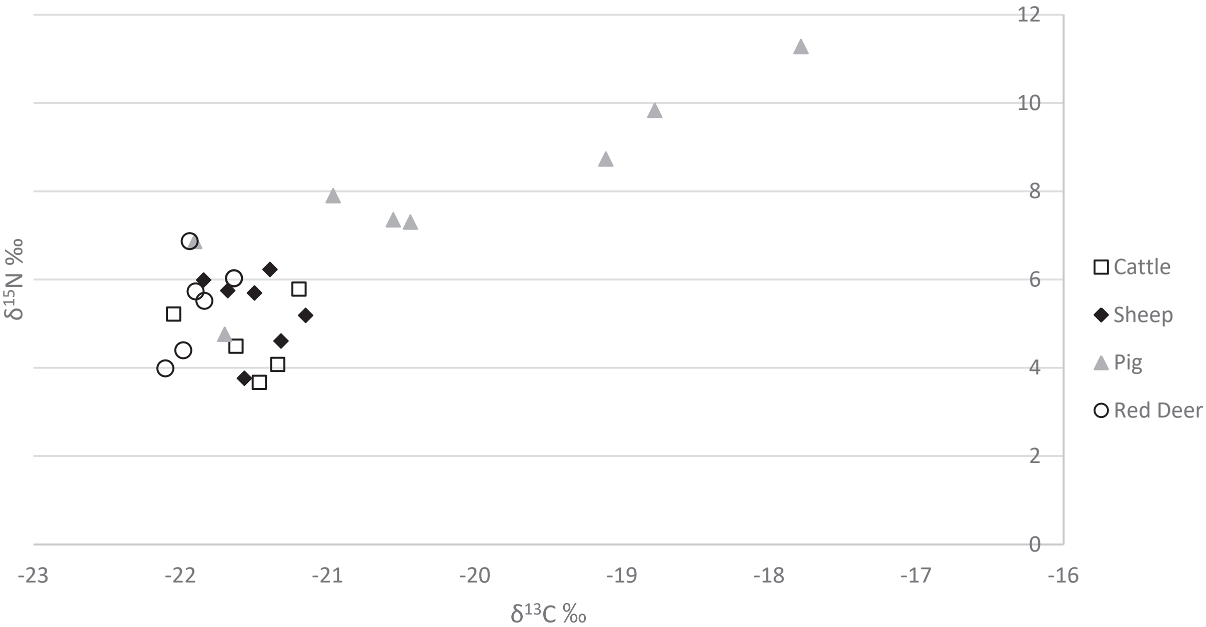

Figure 18.18. Cille Pheadair $\delta^{13}C$ and $\delta^{15}N$ values from cattle, sheep, pig and red deer specimens

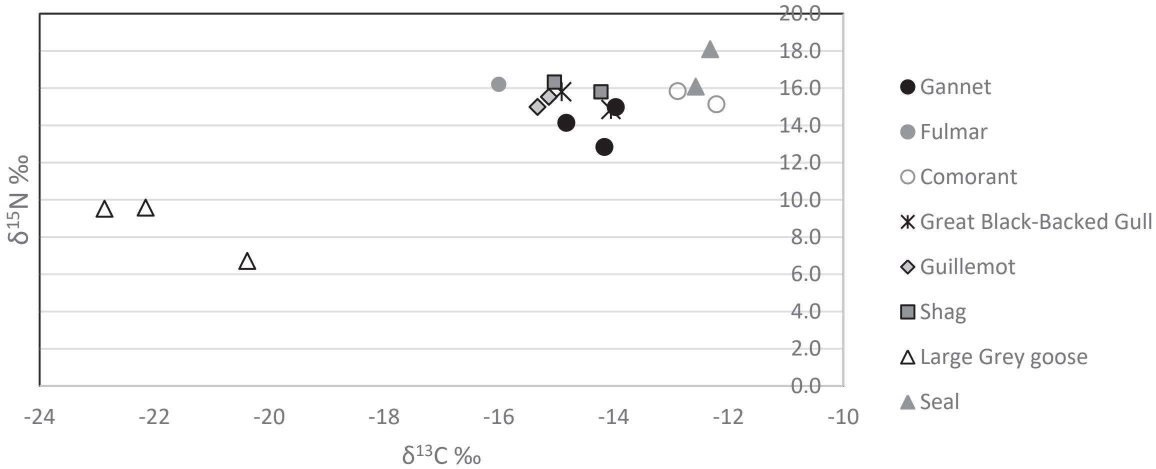

Figure 18.19. Cille Pheadair $\delta^{13}C$ and $\delta^{15}N$ values from bird and seal specimens

lower in protein. This demonstrates a diversity in pig management strategies during phase 5.

The three goose specimens all have values well within the terrestrial isotope range, suggesting that they subsisted predominantly on C3 plants such as grasses and cereals (Figure 18.19). All sea birds and the seals had strong marine signatures, as expected. The two cormorants and the seals had $\delta^{13}C$ values 2‰ higher than the other marine species.

The results from the stable isotopes are combined to provide an overview of the domestic and wild animal management and ecologies on South Uist during the Norse period.

Discussion

Cattle management

The stable isotope results derived from cattle at Cille Pheadair indicate an herbivorous diet that did not include marine plant material or coastal grazing. None of the cattle exhibit elevated $\delta^{13}C$ or $\delta^{15}N$ values that are typically associated with the consumption of coastal plants or plant material growing in a saline environment (Britton *et al*. 2008; Müldner *et al*. 2014; Jones and Mulville 2016). The isotopic values suggest that cattle were grazed at some distance from the coastline and/or maritime plant communities and were not free to roam and exploit coastal resources. This mirrors the patterns also seen at neighbouring Bornais (Jones and Mulville forthcoming), suggesting similar herbivore management strategies at these neighbouring sites.

At the time of excavation, the site at Cille Pheadair (now destroyed by coastal erosion) was located on machair close to the sea. Erosion has substantially changed the coastline (Hansom 2005) and during the Norse period the settlement probably lay at some distance from the coast (see Chapter 1).

There is zooarchaeological evidence for the retention of small, possibly milking, herds close to the site throughout the year (see section 18.1 'Husbandry'; for Bornais, see Mulville and Powell 2012: 233). Milk was a critical resource, with dairy lipid residues commonly present in the suite of pottery vessels analysed from Norse insular sites (Cramp *et al.* 2014); dairy processing was identified in multiple sherds from Cille Pheadair (see Chapter 22). Whilst stock were probably kept away from local fields, at least during the crop-growing season (see below), the isotopic evidence suggests that these pastures were not coastal. Historically there is a tradition of transhumance on South Uist, with machair-based cattle taken to the interior hills during summer (Smith 2012) and the isotopic values suggest that this pattern of stock movement could have occurred during the Norse period.

Sheep management

No sheep from Cille Pheadair had the elevated $\delta^{13}C$ or $\delta^{15}N$ values associated with feeding in shorefront locations. This is surprising given that isotopic analysis has demonstrated that in the Western Isles in prehistory, from the Bronze Age, the shorefront was routinely used as a foddering location (Jones and Mulville 2016).

A low diversity in isotopic values is observed in the sheep samples from Cille Pheadair. This lack of variety in diet is unusual given what is known about sheep feeding behaviour. Ethological studies of free-roaming sheep in Scotland indicate that they naturally select a diverse range of grasses and forbs (Bullock 1985; Grant *et al*. 1985). Therefore, unrestricted flocks would be expected to exhibit a wide range of isotopic values. The uniformity of values suggests that, unlike the prehistoric flocks (Jones and Mulville 2016), the movement of sheep at Cille Pheadair was controlled and animals did not regularly partake of shorefront grazing.

Pig management

Isotopic evidence indicates a high level of variation in pig diet and management at Cille Pheadair; diets differ between individuals, indicating the consumption of varying quantities of terrestrial and aquatic protein, within predominantly herbivorous diets. Similar levels of dietary variation have been observed locally, for example at the Middle Iron Age broch of Dun Vulan (this included evidence of marine protein consumption; Jones and Mulville 2016), at Bornais (Jones and Mulville forthcoming), and elsewhere in prehistoric Britain (*e.g.* Bronze Age pigs in southwest England varied in both type and level of protein consumption; Madgwick *et al.* 2012a), indicative of a piecemeal approach to foddering individual animals, potentially on a household basis.

Marine foddering of pigs appears to have been a widespread Norse practice. There are similar elevated $\delta^{13}C$ and $\delta^{15}N$ values in pigs from the Icelandic sites of Sveigakot and Hofstaði (Ascough *et al.* 2014), with marine protein consumption also identified within pigs analysed from the later Viking occupation at Ridanäs, Gotland (Koshiba *et al.* 2007), Narsaq, Vatnahverfi and Igaliku, Greenland (Nelson *et al*. 2012). Pigs, as omnivores, can be fed human food, human waste, fish-processing waste or less economically valuable species.

This increasing focus on marine fodder may be linked to the commercialization of fishing at this time. Zooarchaeological datasets (Barrett *et al*. 2001; 1999; Colley 1983; Harland 2006), human isotopic data (Barrett and Richards 2004; Richards *et al*. 2006) and pottery residues (Cramp *et al*. 2014) all show a dramatic increase in human fish consumption (termed the 'fish event horizon'; Barrett 2004). At the same time as herring fishing increases dramatically in the Western Isles (Ingrem 2005), pig isotopic values appear to mirror the associated changes in human diet and trade.

Trading of marine foods in the Norse period has been interpreted as a method of exerting and maintaining chiefly authority, enabling centralized markets to be developed (Perdikaris 1999). Thus the management of pigs at Cille Pheadair, and at a range of contemporary Norse-period sites, was linked to the wider change in economy towards higher levels of fish consumption and production, perhaps to contribute to the wider market economies emerging at this time.

Red deer

There is only a small sample of red deer available and the overlapping isotopic ranges of deer, cattle and sheep indicate that they were occupying a similar niche, located away from coastal areas. With all three species occupying a similar environmental niche, it is possible red deer experienced increasing grazing pressure and disturbance from domestic stock.

Birds

The geese appear to have been subsisting entirely on C3 plants, and potentially represent domestic species (Best 2014), and their dietary behaviour is indicative of consuming an exclusively terrestrial diet, supporting this possibility. The higher $\delta^{13}C$ values observed in the cormorants could be indicative of this species consuming different marine foods to the other sea-birds, such as those found further from the shore, which may explain why they plot alongside the seals.

Conclusion

Our results demonstrate that Norse-period management of herbivorous stock at Cille Pheadair was carefully controlled. This was also the case at Norse-period Bornais (Jones and Mulville forthcoming). In contrast to prehistoric farming strategies, Norse-period cattle and sheep were not free to roam the landscape, with animals foddered on restricted tracts of land. Cattle and sheep were pastured away from the shorefront area, despite the coastal location of many sites. Strict control of stock movement was a response to the specific conditions experienced in the Scottish islands, with both crops and fragile soils needing to be protected to sustain larger scale pastoral and arable

farming. This strategy would have facilitated the production of food to support the larger population size during this period and might have enabled surpluses to be produced to allow participation in trading and market economies that emerged during this time (Barrett *et al*. 2000; Dyer 2002; Hoffman 1996).

Pigs at Cille Pheadair and at nearby Norse-period Bornais consumed marine foods, and this is symptomatic of the increased importance of fish for human consumption and for trade. Pigs might have been fed processing and by-catch waste from the exploitation and preservation of herrings for trade (Ingrem 2005; see Chapter 19) as well as consuming human waste. This porcine foddering strategy mirrors that found at other farmsteads in the wider Norse world (Ascough *et al.* 2014; Koshiba *et al*. 2007), showing a level of connectivity between sites at this time.

Analysis of the red deer samples indicates that the domestic herbivores and red deer were consuming similar diets, indicating dietary overlap between these species. The need for economic success in the islands during this period of economic and cultural change might have placed pressure on the red deer habitats.

19 The faunal remains – birds, fish and marine molluscs

J. Best, J. Cartledge†, C. Ingrem, H. Smith and M. Parker Pearson

19.1 The birds

J. Best and J. Cartledge†

The avian material was initially analyzed by Judy Cartledge, who sadly passed away before her work could be completed. Julia Best reanalyzed and recorded this material, and reported upon the data.

Identification, recording and quantification

The bird bone was identified using material from three reference collections: Cardiff University Archaeology Department, Historic England Fort Cumberland, and Sheila Hamilton-Dyer. The bones were recorded following the conventions set out by Cohen and Serjeantson (1996).

Where it was impossible to differentiate between certain species owing to them being morphologically indistinguishable (and, for example, overlapping in size), or where elements were affected by incompleteness, abrasion, burning, juvenility *etc.*, such bones were grouped as, for example, 'razorbill/guillemot' or assigned to categories such as 'small wader'.

Where elements could not be recorded to species or family (*e.g.* damaged fragments, phalanges and vertebrae), they were assigned to broad size categories (Ayres *et al.* 2003: 360–406; Serjeantson 2009: 81–2):

- very large bird (birds of goose-size and larger);
- large bird (domestic fowl/duck-sized birds, including curlew and tawny owl);
- medium bird (pigeon/partridge-sized birds, including teal, woodcock and godwit);
- small bird (thrush-sized birds);
- tiny bird (birds smaller than thrushes, such as those of finch size).

Vertebrae and phalanges were recorded if above 50% of the bone was present. The minimum number of elements (MNE) was calculated as the sum of the most frequently occurring zone of each element for a species, taking side into account. The MNI for a species was taken as the highest MNE.

Taphonomic features, sex, metrics and ageing data were recorded for all identifiable fragments where possible. Medullary bone was only recorded in already broken bones. The conventions followed are outlined in the discussion for each of these.

Recovery

The excavation and sampling methodologies are described in Chapter 18.

Assemblage and species

The avian assemblage consists of 1,704 fragments of bone, of which 978 are identifiable to species, family or informative category (Tables 19.1–19.3). The remaining 726 bones are unidentifiable beyond 'bird' and for these fragments only phase and context have been recorded (Table 19.4).

The bird bone assemblage from Cille Pheadair is diverse, containing remains from at least 25 species. The number of species present is likely to be notably higher than this minimum figure given the difficulties of distinguishing between certain species. The assemblage contains a large quantity of small waders, and the variety of possible species within this category in particular could mean that the minimum number of species present is underestimated. Furthermore, several species of small passerine could be represented, as well as many different species of ducks and geese which can also be hard to differentiate with certainty. Even this minimum figure shows exploitation of a large number of species from a range of habitats.

However, while the assemblage is diverse, there is focused exploitation of certain birds. Gulls are the most frequently occurring species in the assemblage, particularly herring/lesser black-backed gull. Small waders also form a large proportion of the NISP, both as the 92 fragments only identifiable as 'small wader', and the 55 plover fragments. Ducks, geese and small passerines are the next most frequent birds in terms of NISP and MNI, followed

Table 19.1. Avian NISP and MNI in order of frequency, including size categories

Species	**NISP**	**MNI**
Small Wader	92	15
Herring/Lesser Black-Backed Gull	64	10
Small Passerine	44	7
Great Black-Backed Gull	41	4
Domestic Fowl	39	4
Gannet	35	3
Plover *cf* Golden	35	9
Large Grey Goose *Anser* sp.	29	5
Puffin	28	5
Shag	25	4
Golden Plover	20	5
Fulmar	17	3
Large Duck *cf* Shelduck	17	3
Large Goose sp.	17	5
Large Duck sp.	16	3
Cormorant	15	2
Galliform sp.	13	4
Razorbill/Guillemot	13	3
Wader *cf* Golden or Grey Plover	13	4
Duck/Goose	11	2
Oystercatcher	9	2
Wader *cf* Whimbrel	9	4
Gull *cf* Great Black-Backed	8	2
Wader *cf* Snipe	8	4
Gull *cf* Herring/Lesser Black-Backed	7	4
Large Duck *cf* Mallard/Shelduck	7	3
Crow/Rook	6	3
Duck sp.	6	2
Guillemot	6	2
Large Duck *cf* Mallard	6	2
Large Shearwater	6	1
Manx Shearwater	6	1
Small Passerine *cf* Starling	6	4
Whimbrel	6	3
Common Crane	5	1
Curlew	5	1
Gull sp.	5	1
Medium Wader	5	2
Shelduck	5	3
Great/Lesser Black-Backed Gull	4	2
Large Wader	4	1
Small Goose sp.	4	1
Galliform *cf* Red Grouse	3	2
Starling	3	2
Teal	3	1
Wader *cf* Bar-Tailed Godwit	3	1
Wader *cf* Curlew	3	1
Curlew/Whimbrel	3	1
Galliform *cf* Domestic Fowl	3	1
Little Auk	3	1
Small Gull *cf* Common	3	2
Anser anser possibly domestic	2	2
Columba sp. *cf* Rock/Stock Dove	2	1
Common Gull/Kittiwake	2	1
Cormorant/Shag	2	1
Goose sp.	2	1
Large Shearwater *cf* Great Shearwater	2	1
Raven	2	1
Razorbill	2	1
Wader	2	1
Wader *cf* Oystercatcher	2	1
Wader/Gull	2	1
Black Goose sp. *cf bernicula*	1	1
Duck *Anas* sp. *cf* Pintail	1	1
Great Northern Diver	1	1
Kittiwake	1	1
Plover *cf* Grey	1	1
Rail *cf* Corncrake	1	1
Small Gull *cf* Kittiwake	1	1
Wader *cf* Jacksnipe	1	1
Wader *cf* Lapwing	1	1
White-Tailed Eagle	1	1
Very Large Bird	39	
Large Bird	25	
Small Bird	25	
Large/Very Large Bird	24	
Medium Bird	24	
Medium + Bird	14	
Small/Medium Bird	10	
Medium/Large Bird	8	
Tiny Bird	7	
Very Large Bird *cf* Gannet	6	
Very Large Bird *cf* Goose sp.	4	
Large Bird *cf* Duck sp.	3	
Large Bird *cf* Fulmar/Shearwater	3	
Large Bird *cf* Gull sp.	3	
Large Bird *cf* Large Galliform	2	
Large Bird *cf* Raven	1	
Medium Bird *cf* Puffin	1	
Very Large Bird *cf* Eagle	1	
Very Large Bird *cf* Large Skua	1	
Very Large Bird *cf* Shag/Cormorant	1	
Total	**978**	

Table 19.2. Avian NISP, % NISP and MNI grouped to show avian species abundance, excluding size categories

Species	NISP	% NISP	MNI
Gull	136	17.5	11/12
Small Wader	92	11.9	
Duck	61	7.9	7
Goose	55	7.1	8
Plover, Golden/*cf* Golden	55	7.1	10
Small Passerine	53	6.8	8
Domestic Fowl	39	5.0	
Gannet	35	4.5	
Puffin	28	3.6	
Shag	25	3.2	
Fulmar	17	2.2	
Cormorant	15	1.9	
Galliform sp.	13	1.7	
Wader *cf* Golden or Grey Plover	13	1.7	
Razorbill/Guillemot	13	1.7	
Duck/Goose	11	1.4	
Oystercatcher	9	1.2	
Wader *cf* Whimbrel	9	1.2	
Wader *cf* Snipe	8	1.0	
Crow/Rook	6	0.8	
Whimbrel	6	0.8	
Guillemot	6	0.8	
Large Shearwater	6	0.8	
Manx Shearwater	6	0.8	
Curlew	5	0.6	
Common Crane	5	0.6	
Medium Wader	5	0.6	
Large Wader	4	0.5	
Galliform *cf* Red Grouse	3	0.4	
Galliform *cf* Domestic Fowl	3	0.4	
Wader *cf* Bar-Tailed Godwit	3	0.4	
Wader *cf* Curlew	3	0.4	
Curlew/Whimbrel	3	0.4	
Little Auk	3	0.4	
Cormorant/Shag	2	0.3	
Razorbill	2	0.3	
Large Shearwater *cf* Great Shearwater	2	0.3	
Raven	2	0.3	
Columba sp. *cf* Rock/Stock Dove	2	0.3	
Wader	2	0.3	
Wader *cf* Oystercatcher	2	0.3	
Wader/Gull	2	0.3	
White-Tailed Eagle	1	0.1	
Great Northern Diver	1	0.1	
Plover *cf* Grey	1	0.1	
Wader *cf* Jacksnipe	1	0.1	
Wader *cf* Lapwing	1	0.1	
Rail *cf* Corncrake	1	0.1	
Total	**776**	**100**	

by domestic fowl (chickens) and gannets. Other seabirds (the puffin, shag, cormorant and fulmar) are also well represented (Tables 19.1–19.2).

Table 19.2 shows grouped species categories (for gulls, ducks, geese, plovers and small passerines) to help explore the exploitation patterns more clearly and counteract some biases of the identification process and species diversity. For example, the difficulties in distinguishing different goose species, combined with the desire to preserve all usable information, meant that the geese were identified into several categories of confidence (*e.g.* 'large grey goose *Anser* sp.'). Such separate groupings can make it hard to see how numerous geese bones are overall, particularly where only certain skeletal elements are distinctively identifiable to exact species. These grouped categories have been accounted for when exploring overall abundance via comparisons with species that have not been grouped (*e.g.* gannet), as this could underestimate the importance of the latter as individual species.

All of the species present are edible but some might not have been eaten, such as the white-tailed eagle which could have been killed for its feathers or to protect livestock (Serjeantson 2010: 151–3).

It is interesting to note that while summer breeding visitors such as the gannet and the auks form an important part of the fowling activities at Cille Pheadair, many of the species exploited extensively would have been available at multiple points of the year. These include herring gull and great black-backed gull, the greylag goose, several species of duck, the shag and the cormorant (Heinzel *et al.* 1992: 46–66, 150; Nelson 1980: 118–27). While this is not unusual, many sites (archaeologically and historically) have a summer fowling focus on seabirds visiting the land to breed (Baldwin 2005: 115, 120–5, 150–3; Best 2014).

During the Norse period there appears to be a diversification of fowling in the Hebrides, with a greater use of waterfowl (such as ducks and geese) and waders than is seen in earlier periods (Best and Mulville 2014; 2016). However, whilst many of the aforementioned species at Cille Pheadair might have been exploited year round, they were also definitely hunted in the breeding season as is demonstrated by the presence of medullary bone

(indicating breeding females) and juveniles (see sections on 'Sex' and 'Age', below).

Other species whose presence in the assemblage indicates multi-season exploitation of the island's avian resources include the great northern diver, which is primarily a winter visitor, the wintering little auk, and the black geese (Brent and barnacle) who today return to Britain for the winter (Pollock *et al.* 2000: 31–4, 57; Stroud *et al.* 2001: 93–109, 437).

The species identified in the Cille Pheadair assemblage indicate year-round exploitation of resident birds, whilst also demonstrating logical hunting of summer-visiting breeding seabirds, and the use of winter visitors to supplement diet and economy at a time of the year when other resources might have been limited. The number and range of species suggest opportunistic fowling of birds when encountered (perhaps while hunting a different bird species or performing tasks such as tending livestock) in addition to calculated capture of certain species, such as the gulls. Some fowling methods are inherently indiscriminate, such as unattended nooses (which tighten when a bird steps into them and struggles), meaning that a variety of species might have been captured by chance if methods such as this were employed (Baldwin 2005: 131–2).

Overall, the large number of species present shows that the inhabitants of Cille Pheadair were making good use of the varied wild avian resources on offer to them, while supplementing this with the management of domestic fowl. While wild birds dominate this assemblage, domestic fowl account for at least 5% of the NISP (and this total may be higher when the 'Galliform' category is considered; see 'Age' below). Although no bones have been securely identified as being of domestic geese, two possible such bones tentatively suggest potential management of these birds (see the isotopic analysis in Chapter 18).

The large proportion of gulls in the assemblage may be due, in part, to their breeding habits. The gull species in the assemblage are colonial nesters, which would have allowed multiple birds to be caught in an area with comparative ease. Several of the species, particularly the herring gull but also the lesser black-backed gull and great black-backed gull, would have very likely nested on the machair, which is a suitable breeding habitat (Cartledge and Serjeantson 2012; Heinzel *et al.* 1992: 150). The birds would have therefore been available in the immediate vicinity of the site, and at more than one time of the year.

The most commonly captured gulls at Cille Pheadair – the herring/lesser black-backed gull and the great black-backed gull – lay multiple eggs in a clutch (normally three), meaning that these could have been sustainably harvested. Gulls are also often able to lay again if their eggs are taken, allowing multiple harvests to be made; such harvesting will also delay the fledging of young (Lysaght 2005: 107). Eggs from the larger gulls would have been a good food source and several could be taken from a nest at once, as would also have been possible for eggs of the shag and cormorant, which also lay in clutches, unlike the single egg laid by the gannet.

Eggs from these large gulls are sizeable (being slightly bigger than a duck egg), have a desirable taste, and were still collected on Scottish and Irish islands and coasts into the twentieth century; documented examples of such egg-collecting include Loch Maree and the Summer Isles (western Scotland) and the Blasket islands (southwestern Ireland; Lysaght 2005: 87–92, 106–7; Baldwin 2005: 121).

Gulls also dominate the avian assemblage at the nearby site of Bornais but on a much larger scale, particularly in Mound 1 where they make up nearly two-thirds of the Iron Age bird bone. They remain the most frequent species in Mound 1's Norse material but decline to nearly 40% of the bird assemblage (Cartledge and Serjeantson 2012). In the Middle–Late Norse assemblage from Bornais Mound 3, gulls are still the most commonly occurring birds but now only account for around a quarter of the assemblage (Sharples and Cartledge 2005: 163–4). In the combined Early to Late Norse assemblages of Bornais Mound 2 and Mound 2A, gulls form 21% and 20% of the NISP respectively, but form a much lower proportion of the combined Late Norse assemblage than the combined Early and Middle Norse assemblages (Best forthcoming). It has been suggested that this decrease in gulls at Bornais might have resulted from increased grazing upon the machair, or the pressure of culling (Cartledge and Serjeantson 2012; Hallanaro 2005). Variations in the quantity of gulls present in the assemblages from the different periods of occupation may also reflect fowling choice or seasonally different episodes of exploitation.

Within the Cille Pheadair assemblage, the number of gulls also decreases in the later phases. For example, in phases 2–6 gulls form between 16% and 19% of the NISP, but in phases 7, 8 and 9 this drops to 9%, 11% and 4% respectively. The bones from the different phases are fragmented to a similar degree, so this decrease is unlikely to result from biased identification. It is clear that various species of gull were prevalent enough in the locality to remain one of the most frequently captured birds in all phases at Cille Pheadair and be the long-term, dominant species at Bornais. Continued exploitation of a population, if not conducted in a sustainable manner, could, however, have affected the breeding numbers, as would any encroachments of grazing animals onto their breeding sites.

Small waders also make up a large part of the Cille Pheadair NISP. Given their small size, they would not have contributed as much meat per individual as the larger birds that were also numerous (such as gulls, ducks and geese). If the small waders were caught in fairly large numbers, however, which here appears to be the case, then they could still have been a valuable dietary addition. Some of these birds might have been taken from the nest, as is suggested by the presence of immature and sub-adult 'small wader' bones (see Table 19.11). When catching these birds in large numbers, it is likely that they would have been taken by net (Baldwin 2005: 132–5; Serjeantson 2009: 244–6).

Plovers are notably abundant in the assemblage, particularly golden plover. The bones of immature golden plover and plover (*cf.* golden) again suggest that some

birds were captured from the breeding site, although the adults are known to be nervous on the nest. Today the British breeding population of golden plovers is swollen in winter by the arrival of birds from Scandinavia, Iceland and western Siberia (Byrkjedal and Thompson 1998; Hull 2001: 164; Stroud *et al*. 2001: 253–9). The wintering and migrating populations form and move as large dense flocks, which would be favourable for netting, implying that this resource could also have been targeted in the winter and during passage. The smaller waders should perhaps be considered not as meat per kill/individual, but rather per catch, with one netting of, for example, plovers being more than equal to the meat provided by a gull or goose.

Larger waders such as the common curlew and whimbrel were also captured. While these species are quite similar in appearance, the whimbrel is today predominantly a summer visitor to the Hebrides whereas the curlew gathers around the Hebridean islands in winter despite being present in some areas of Britain year-round or as a breeding population. These curlews are joined by winter migrants from Scandinavia, particularly Finland and Sweden, potentially suggesting that concentrations of these wintering birds might have been a valuable winter resource for the islanders (Burton and Fuller 1999: 18; Heinzel *et al.* 1992: 138; Hull 2001: 175–6; Stroud *et al*. 2001: 312–16). Such wintering bird populations would have provided valuable fresh meat. This further indicates that fowling of wild birds was not only a summer activity focused on the commonly exploited breeding seabirds, but that other avian resources were utilized at multiple points of the year.

The presence in the assemblage of seabirds, water birds, waders and land birds shows that a variety of habitats were exploited and a range of capture techniques were employed. Such habitats include the moorland, grassland, machair, inland water, shoreline, rocky coasts, sea cliffs and the sea. Cormorant and shags could have been found on the rocky areas of coastline, with the cormorant sometimes coming to inland water. Many waders such as the golden plover populate muddy shores and marshes, with others such as the curlew favouring moors, sand dunes and damp grassland (Heinzel *et al.* 1992: 32, 122, 138). Burrow-nesting species such as the puffin, Manx shearwater and shelduck, might have made their nests in the machair dunes or grassy slopes. It is most probable that these birds were exploited in or around the nest where they are more easily accessible rather than, for example, at sea.

The puffin comes to land only to breed but remains at the nesting site for several months. An (almost certainly articulated) concentration of puffin bones was recovered from a sand fill/floor of House 007. These bones display probable sub-adult characteristics and as such may represent a fledgling bird. Birds such as puffins might have been removed from the burrow using an arm or a stick, or netted/clubbed from the air when returning from fishing.

The Manx shearwater is also a breeding visitor to the Hebridean coast, and the juvenile bones in this assemblage show that both young and adult birds were taken, probably around the nest (see Table 19.11). The shelduck is today a resident species in most of the Western Isles but, as it takes its young to water almost as soon as they hatch, it too would have been most easily captured while sitting on the nest (Nelson 1980: 118–25; Šťastný 1995: 86).

Gulls and geese could have been found upon the machair at several points of the year, and inland water exploited for certain ducks and geese (Heinzel *et al.* 1992: 46–66; Nelson 1980: 118–27). Land birds such as the raven, crow/rook, small passerines and *Columba* sp. *cf* rock/stock dove could have been sourced from open and agricultural land around the settlement, and some from cliffs or ledges (Cartledge and Serjeantson 2012).

Today there is no suitable habitat in South Uist for primarily cliff-nesting seabirds that only come to land to breed, such as the gannet, razorbill and guillemot (Serjeantson 2001: 44, 46–8). This suggests either that a sufficiently different environment supported them, that they bred more widely in the past, that they were captured at sea (either intentionally or accidentally by fishing equipment), or that these birds were exploited at breeding sites beyond the immediate vicinity of Cille Pheadair.

Data by phase

The largest identifiable and total assemblages of bird bone came from phases 4 and 5 (Tables 19.3–19.4; note that phase 0 is the assemblage from the Pictish cairn). The distribution of bone between the phases is fairly consistent, with

Table 19.3. Avian NISP by phase as a count and percentage of the total NISP

Phase	0	1	2	3	4	5	6	7	8	9	Unknown	Total
NISP	5	33	73	96	204	198	76	119	53	101	20	**978**
% NISP	1	3	7	10	21	20	8	12	5	10	2	**100**

Table 19.4. Unidentifiable fragments by phase as a count and percentage of the unidentifiable avian bone

Phase	0	1	2	3	4	5	6	7	8	9	Unknown	Total
Unidentified	0	8	32	102	127	150	79	133	49	39	7	**726**
% Unidentified	0	1	4	14	17	21	11	18	7	5	1	**100**

similar-sized assemblages having comparable proportions of identifiable and unidentifiable fragments.

A similar range of species was exploited in all phases, with a consistent focus on gulls, ducks, geese, domestic fowl and small waders, followed by other large seabirds such as the gannet, shag and cormorant (Table 19.5). The use of species that could have been captured at multiple points of the year (such as several gulls, the shag and cormorant) is also a consistent feature throughout the different phases. As mentioned above, there are, however, some exploitation variations through time, such as the decline in gulls.

Rarer species provide insights into occasional capture,

Table 19.5. Avian NISP by phase, including size categories

Species	Phase											Total
	0	1	2	3	4	5	6	7	8	9	U/S	
Herring/Lesser Black-Backed Gull		3	5	8	13	14	7	5	4	4	1	64
Great Black-Backed Gull			7	4	12	12	2	4				41
Gull *cf* Great Black-Backed		1	1	2	2		2					8
Gull *cf* Herring/Lesser Black-Backed					2	3	2					7
Gull sp.				1	1			2			1	5
Great/Lesser Black-Backed Gull				1	1	1			1			4
Small Gull *cf* Common						2	1					3
Common Gull/Kittiwake					1				1			2
Kittiwake			1									1
Small Gull *cf* Kittiwake						1						1
Small Wader	1	3	8	7	30	12	12	11	4	2	2	92
Large Duck *cf* Shelduck				2	2	6	1	3		3		17
Large Duck sp.				2	3	4	3			4		16
Large Duck *cf* Mallard/Shelduck						1		4	1	1		7
Duck sp.		1	2		3							6
Large Duck *cf* Mallard					1	3	1		1			6
Shelduck				1			1		1	2		5
Teal		1			1	1						3
Duck *Anas* sp. *cf* Pintail					1							1
Large Grey Goose *Anser* sp.		2	3	2	4	9	2	1	4		2	29
Large Goose sp.			1	1	6	5		3	1			17
Small Goose sp.		1		1				2				4
Anser anser possibly domestic					1	1						2
Goose sp.			1		1							2
Black Goose sp. *cf bernicula*									1			1
Plover *cf* Golden			3	3	10	13	2	3		1		35
Golden Plover			1		7	3	2	6		1		20
Small Passerine		1	1	4	8	12	4	13	4	2	4	53
Domestic Fowl		3	1		8	8	4	10	2	3		39
Gannet		2	5	4	6	7	1	9	1			35
Puffin		1		3	1	3	2	4	2	12		28
Shag		1	2	1	6	6	2	5	1	1		25
Fulmar			2	1	1	3	6	3	1			17
Cormorant		1	1	1	4	2	4	1		1		15
Galliform sp.		1		1	5	4		1	1			13
Razorbill/Guillemot			1	4		5	1	1	1			13
Duck/Goose			1		2			1		7		11
Wader *cf* Golden or Grey Plover					1	2	5	2			1	11

Table 19.5. continued

Oystercatcher				1	1	4		1	2			9
Wader *cf* Whimbrel		1							3	5		9
Wader *cf* Snipe						3	1	3	1			8
Crow/Rook				1	1	4						6
Guillemot				1	3			1	1			6
Large Shearwater			1	3	2							6
Manx Shearwater			1	2		2			1			6
Whimbrel				1		1				4		6
Common Crane					3	2						5
Curlew				2	3							5
Medium Wader			2		1			1	1			5
Large Wader					1					3		4
Curlew/Whimbrel										3		3
Galliform *cf* Domestic Fowl		1			2							3
Galliform *cf* Red Grouse			2			1						3
Little Auk						1	1			1		3
Wader *cf* Curlew				1						2		3
Wader *cf* Bar-Tailed Godwit								2	1			3
Columba sp. *cf* Rock/Stock Dove						2						2
Cormorant/Shag					1	1						2
Large Shearwater *cf* Great Shearwater			2									2
Raven						1			1			2
Razorbill							2					2
Wader					2							2
Wader *cf* Oystercatcher			1							1		2
Wader *cf* Golden or Grey Plover								1	1			2
Wader/Gull										2		2
Great Northern Diver								1				1
Plover *cf* Grey				1								1
Rail *cf* Corncrake						1						1
Wader *cf* Jacksnipe				1								1
Wader *cf* Lapwing						1						1
White-Tailed Eagle						1						1
Very Large Bird	1		3	14	5	8	1	3	1	3		39
Large Bird		1	3	3	4	4	1	4	4	1		25
Small Bird	3		1	5	10		1			1	4	25
Large/Very Large Bird				4	1	2	2	2	4	9		24
Medium Bird		5	1	1	4	8		1		4		24
Medium + Bird		1	6			5					2	14
Small/Medium Bird										10		10
Medium/Large bird						1		1		6		8
Tiny Bird			1		6							7
Very Large Bird *cf* Gannet		1	1		3				1			6
Very Large Bird *cf* Goose sp.			1		3							4
Large Bird *cf* Duck sp.					2	1						3
Large Bird *cf* Fulmar/Shearwater				1				1	1			3
Large Bird *cf* Gull sp.					1			2				3
Large Bird *cf* Large Galliform		1						1				2

Table 19.5. continued

Large Bird *cf* Raven						1						1
Medium Bird *cf* Puffin										1		1
Very Large Bird *cf* Eagle										1		1
Very Large Bird *cf* Large Skua									1			1
Very Large Bird *cf* Shag/Cormorant					1							1

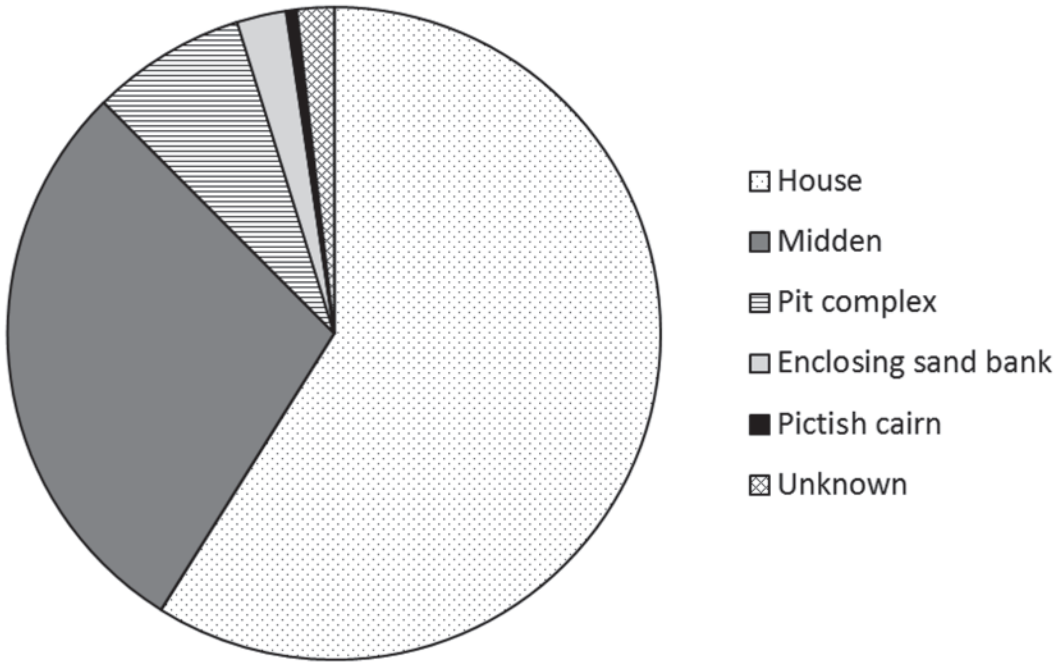

Figure 19.1. Distribution of identifiable avian bone within the site

for example, the common crane (occurring in phases 4 and 5) might have been caught on migration through Britain, and once bred more widely (Serjeantson 2010: 148–9).

Distribution of the avian remains within the site

The majority of the identifiable bird bone came from house contexts (576 fragments) with the next largest quantity recovered from midden contexts (281 fragments; Figure 19.1). A further 75 fragments came from the pit complex, 24 from the enclosing sand bank, and five from the Pictish cairn (three small bird bones, one goose-sized bird, and one small wader). The largest assemblages came from House 500 Stage I in phase 4, the northeastern midden in phase 5, and the ruins of House 007 in phase 9 (Table 19.6). One bone of particular interest is a phase 5 pathological gannet carpometacarpus (with probable osteomyelitis), half of which was recovered from House 500 Stage II, and half from the northwestern midden. The appearance of the break is old, indicating movement in antiquity.

Elemental distribution

Elemental representation was explored by NISP for all species combined, and by MNE for species/species groups (to counteract identification biases) with a NISP of four or above (Figure 19.2; Table 19.7). Elements from all parts of the bird are present for almost every species groups, suggesting that birds entered the site whole. There is a very strong dominance of wing elements, followed by bones of the lower leg (tibiotarsus and tarsometatarsus) and the coracoid. The sternum and synsacrum/pelvis are also fairly well represented, considering their potential susceptibility to fragmentation.

Preferential survival of the main wing and leg long bones may be influenced by robusticity and density (Cartledge and Grimbly 1999: 286–8; Serjeantson 2009: 153–64). Compared to the other key long bones, however, the femur (a meat-bearing, robust bone) is poorly represented. This, when combined with the abundance of carpometacarpi and wing digits, could potentially suggest the removal of parts of the bird that were not intended for consumption such as the wings and lower legs.

Elemental representation is similar for large and small species, with most birds having a range of elements present

Table 19.6. Distribution of avian bone (NISP) by phase and location

Area of Site	Phase										Total
	0	1	2	3	4	5	6	7	8	9	
House 007									46	100	**146**
Outhouse 006								5	10	1	**16**
House 312								78			**78**
Sheds 400 & 406						1	62				**63**
House 500 Stages I and II					111	78					**189**
House 500 forecourt						1					**1**
Structure 353 (north room of House 500)					14						**14**
House 500 Stage I construction					10						**10**
Make-up layer of House 500					1						**1**
House 700				39							**39**
House 700 sandbank				19							**19**
Enclosing sand bank		4	20								**24**
Pit complex		29	46								**75**
Northeastern midden			6	27	36	88		17			**174**
Northeastern midden (revetted area)				4	16						**20**
Northwestern midden						23	14	16			**53**
Northwestern midden, House 500						1					**1**
Southeastern midden				7	17	6		3			**33**
Pictish cairn	5										**5**

but a higher representation of wing and lower leg bones, suggesting that whole carcasses were entering and being processed on site (Table 19.7). Small waders including the golden plover have high numbers of lower wing and lower leg elements, but lower numbers of humeri and femora, suggesting that the extremities of these small birds might have been removed before consumption and that the other elements could have been damaged, weakened or disposed of differently during processing. There does not appear to have been any differential deposition of elements (or species) across the site, with similar levels occurring in, for example, houses and middens.

Taphonomic information

The avian assemblage contains bones modified by butchery, burning and gnawing, showing post-mortem modification by human and animal agents (Table 19.8).

Only 13 bird bones are burnt, totalling 1% of the identifiable assemblage. This is similar to Cille Pheadair's mammalian assemblage where 2% of the identifiable bone displays evidence of burning. This low incidence of burning on bird bone is common within other Hebridean assemblages, including temporally comparable sites such as Bornais as well as earlier examples such as Late Bronze Age–Early Iron Age Cladh Hallan (Best 2009; 2014; forthcoming; Best and Mulville 2013; Cartledge and Serjeantson 2012). Burning occurs primarily on the wing and leg long bones of several gull species, domestic fowl, large geese and small waders. Two examples of burning (one large goose and one herring/lesser black-backed gull) occur on articular ends and are suggestive of cooking. The other examples are inconclusive.

Overall, 6% of the identifiable bird bone was butchered (59 fragments). Of these, 58 fragments were knife-cut. One fragment, a large grey goose (*Anser* sp.) scapula, was chopped and knife-cut. One bone (a proximal shag ulna) was worked into a sharp, fine point resembling an awl-like implement. There are 14 additional fragments with possible butchery. The percentage of the avian assemblage butchered is slightly higher than typical butchery frequencies for comparable avian assemblages (Cartledge and Serjeantson 2012).

The humerus is the most commonly butchered element (13 instances), followed by the furcula and radius (n=9), coracoid and femur (n=7), tibiotarsus (n=5), ulna (n=4), sternum (n=3), and scapula and synsacrum (n=1). When the proportion of each element butchered is considered, 45% of the furcula were cut, 20% of all femora, and 12% of the humeri and coracoids. Most of the cuts on the

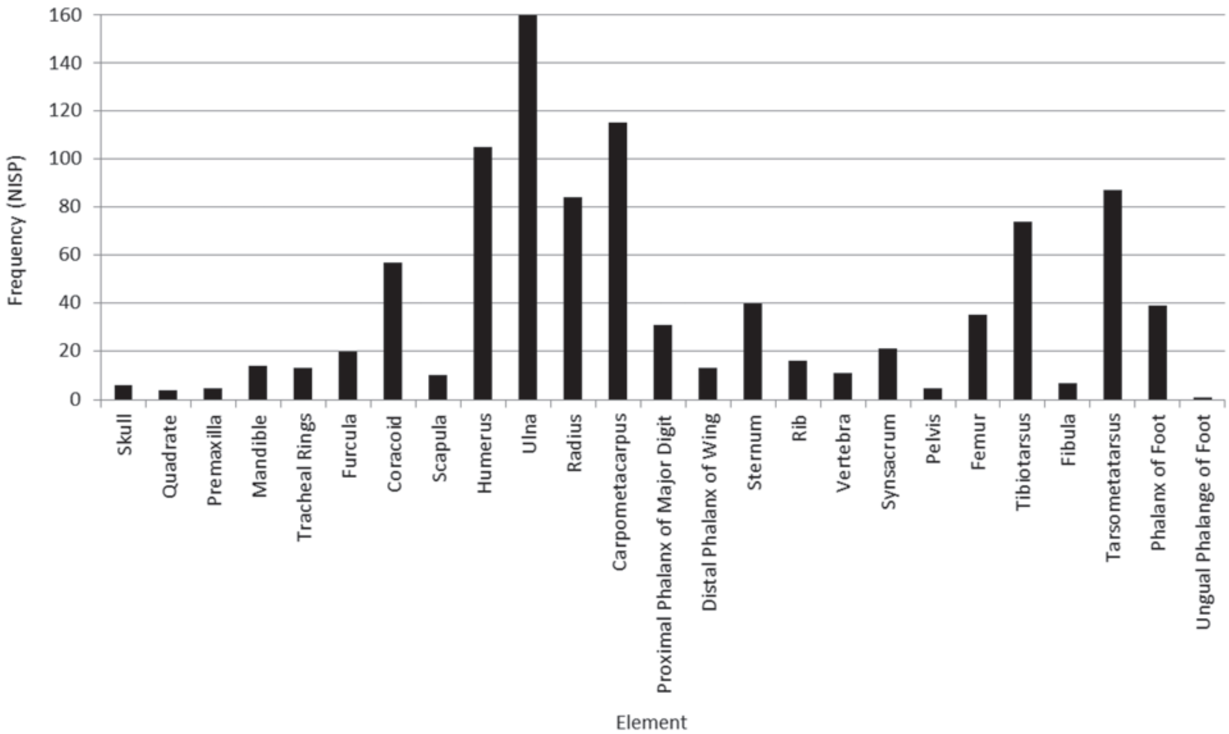

Figure 19.2. Element representation for all identifiable avian fragments (species combined)

femora occur on the shaft or the distal articulation, again potentially indicating removal of extremities, whilst the cuts on the pectoral girdle suggest carcass preparation and consumption. Overall, the cut-marks occur on the ends and shafts of bones, showing that butchery was used for disarticulation and meat removal (Serjeantson 2009: 131–4).

Logically, large birds would have been most frequently butchered; the only chop-mark is from a goose (Table 19.9). Larger birds would have required more processing before consumption or storage, including the removal of waste elements that might have been left on smaller birds or removed from them without knives. However, wing bones from smaller birds such as the puffin, Manx shearwater and plover show evidence of butchery, suggesting pre-consumption processing and possible wing removal.

Notably, one small passerine sternum was cut, showing that passerine remains should not automatically be considered non-anthropogenic, and that the inhabitants of Cille Pheadair were making use of less obvious resources when available. Little butchery is needed on such small birds, but historical sources from the Outer Hebrides record small birds being split open down the back and stood to cook or dry by the fire, a plausible possibility for small species in the archaeological dataset (Harman 1997: 217; Maclean 1992: 67–8).

Gnawing is the most frequent modification, recorded on 8% of the identifiable bird bones (81 instances). There are also 28 fragments with possible gnaw-marks. Two bones had been digested (a phalanx of the foot and a coracoid). Carnivore gnawing dominates the profile, but five bones had been gnawed by rodents. Gnawing occurs on bones of nearly all species, including a white-tailed eagle carpometacarpus. Gnawing is most frequent on the wing long bones, the coracoid and the femur. The humerus is the most gnawed element, with 27 occurrences, representing 27% of the humeri. At least 15% of the gnawed bones also exhibit cut-marks, indicating that animals had access to these remains after human processing, preparation and/or consumption of the bird resources.

Sex

Sex is identifiable for 12 specimens. Ten contain medullary bone, showing that they are from female birds in lay, and two male chickens were identified by the presence of a large spur on the tarsometatarsus (Table 19.10). However, hens can occasionally grow spurs, making this a non-definite sexual trait (De Cupere *et al.* 2005: 1592; Serjeantson 2009: 48).

Medullary bone is a deposit of calcium which forms in the long bones of female birds just before and during the egg-laying period (Dacke *et al*. 1993: 63). Medullary bone was identified in domestic and wild species at Cille Pheadair. Its presence in domestic fowl suggests that they would have been kept partially for their eggs, a valuable secondary product that would probably have been available at multiple points of the year. As mentioned above, while certain gulls, ducks and geese might have been present all year round, the medullary bone shows that some of these birds were captured during the breeding and nesting season.

Table 19.7. MNE representation by avian species (with a NISP of four or above). The shaded columns indicate the grouped categories

Element	Skull	Quadrate	Premaxilla	Mandible	Furcula	Coracoid	Scapula	Humerus	Ulna	Radius	Carpometacarpus	Proximal phalanx of major digit	Sternum	Synsacrum	Pelvis	Femur	Tibiotarsus	Tarsometatarsus
Common Crane						1		1									1	1
Manx Shearwater								1	1								1	1
Large Shearwater Combined	1			1					1	1	1					1		1
Medium Wader								1			1							2
Curlew						1		1			1					1		1
Oystercatcher						1		1	1	1	1	1					2	
Whimbrel																2		3
Crow/Rook									3	1	1						1	
Razorbill/Guillemot Combined				1		1		3	3	2	1	1				2	1	1
Wader *cf* Snipe									4		1							
Small Wader							1	2	15	5	8		1	1		1	5	10
Small Passerine						1	1	5	8	2	3		2	1	1	1	3	5
Puffin						2	1	5	3	4	3		1				1	
Duck/Goose				2					1		1	1	1	1	1	1		1
Combined Large Ducks				1		7	1	4	3	3	5	3		1	1	1	2	2
Fulmar						1	1	1	3	1	2	2					1	1
Cormorant				1		2		1	1	1	2					1	2	
Shag						4		1	1	2	2			1		2	1	2
Galliform/Galliform *cf* Domestic Fowl					4			1	1					1			2	3
Domestic Fowl						3	1	3	4	3	4					3		2
Combined Large Geese				1	5	1	1	8	1	2	3	1	2	1		1	2	3
Wader *cf* Golden or Grey Plover									4	1	2						1	1
Plover, Golden/*cf* Golden								3	8	8	10						3	3
Gannet		1		1	1	2	1	3	2	2	3	3		1		1	1	
Remaining Large Gulls Combined			1			1			2	1	1	6					1	
Great Black-Backed Gull			1	1		2	1	4	4	1	3	1	2	2			1	2
Herring/Lesser Black-Backed Gull				1		3		6	5	3	6		10	1			3	3

Age

The identifiable assemblage contains 49 juvenile specimens and a further 37 fragments that are likely to be sub-adult but cannot be recorded with certainty owing to fragmentation or poor condition. The juvenile birds were recorded, based on Serjeantson (2009: 46), as:

- very young: bone half-ossified or less;
- immature: bone more than half-ossified, porous and unfused;
- sub-adult: bone full-sized and fused, with fusion line visible, slightly porous.

Several species of juvenile birds are present, ranging in size from small waders to large geese (Table 19.11). The juvenile bone suggests that more domestic fowl may be present in the assemblage than the confidently identified

Table 19.8. Taphonomic information for the identified avian assemblage

	Butchered	Burnt	Gnawed
No. of bones	59	13	81
% of NISP	6	1	8

Table 19.9. Butchery frequency by avian species

Species	Knife cut	Worked	Chopped & cut	Possible cuts
Large Goose sp.	8			
Shag	6	1		1
Large Grey Goose *Anser* sp.	5		1	
Herring/Lesser Black-Backed Gull	5			
Domestic Fowl	5			2
Gannet	4			2
Cormorant	3			1
Galliform *cf* Red Grouse	2			
Great Black-Backed Gull	2			
Plover *cf* Golden	2			
Puffin	2			
Duck/Goose	1			
Large Duck *cf* Mallard	1			1
Large Duck *cf* Mallard/Shelduck	1			
Shelduck	1			
Duck sp.	1			
Fulmar	1			1
Galliform sp.	1			
Golden Plover	1			
Guillemot	1			
Manx Shearwater	1			
Small Passerine	1			
Large Bird	1			
Very Large Bird	1			
Gull sp.				1
Large Duck sp.				1
Small Goose sp.				1
Small Passerine *cf* Starling				1
Wader *cf* Bar-Tailed Godwit				1
Large Bird *cf* Fulmar/Shearwater				1

Table 19.10. Sex data by avian species

Phase	Species	Female	Male
4	Domestic Fowl	2	
	Duck/Goose	1	
	Gannet	1	
	Herring/Lesser Black-Backed Gull	2	
5	Domestic Fowl	1	
	Large Duck sp.	1	
6	Domestic Fowl		1
7	Domestic Fowl	1	
	Large Bird *cf* Large Galliform	1	
9	Domestic Fowl		1

bones indicate. Five of the juveniles were very young, including two bones of 'galliform *cf* domestic fowl'. When considered alongside the bones of immature and sub-adult domestic fowl/large bird *cf* galliform, this could provide evidence for management of domestic stock through the killing and consumption of young birds, possibly males that could not have contributed eggs to earn their keep. It may also reflect natural mortality profiles in domestic stock-keeping that are not evident among the wild species.

The presence of three sub-adult fulmar bones is of particular interest, showing that young fulmars were present in the vicinity of the site. Today, fulmars only come ashore to their breeding sites, but they may be present at these sites for much of the year, and only absent for around three months in the autumn/winter (Maclean 1992: 92–4). The occurrence of young fulmars, the species' relative frequency in the assemblage (17 fragments; 2% of the NISP), and their occurrence across seven phases of the site's occupation suggest a more extensive breeding distribution, prior to the nineteenth-century expansion of its historically constricted breeding range.

Juvenile birds are present in all phases, excluding phase 0 (Table 19.12). The assemblages for phases 2 and 8 contain the most juvenile bones as a percentage of the overall NISP for each phase. The large phase 4 assemblage contains a high proportion of the juvenile bone (31%) and produced 60% of the females with medullary bone (Tables 19.10, 19.12), which includes both wild and domestic species. The data demonstrate that summer exploitation of breeding birds and the use of breeding domesticates formed an important part of avian exploitation patterns, but as part of a year-round calendar of bird use.

19.2 The fish

C. Ingrem

A large quantity of fish bone was recovered from all phases of occupation and a variety of deposits by hand collection, on-site sieving and flotation of environmental samples. This report considers a sub-sample of the remains recovered from securely dated floors, hearths, middens, pits and postholes.

Methodology

The fish bones were identified and recorded at the Centre for Archaeological Analyses (CAA), University of Southampton with the aid of the comparative collection housed in the Laboratory for Zooarchaeological Research (LAZOR) and using a low-power (×10) binocular microscope. All fragments were recorded to species and anatomical element where possible (with the exception of ribs and fin spines) to produce a basic fragment count of the number of identified specimens (NISP). Unidentifiable fragments in the >10mm sample were also counted and quantities in the <10mm material estimated.

In order to overcome the problems of differentiating between closely related species, identification bias and to facilitate comparative studies, a selected suite of elements has been used in the analysis of body part representation (see Table 19.14). Clupeids were identified to species using the morphology of the opercular and size characteristics, and members of the wrasse family using the dentary, premaxilla and pharyngeal bones. In the absence of operculars diagnostic to pilchard, all clupeid remains have been classified as herring for the purposes of this report.

The proportion of an element represented by each fragment was recorded as < 25%, 25–50%, 50–75% and 75% according to completeness. Where possible, elements were sided. The minimum number of individuals (MNI) was determined according to the frequency of the most numerous element and divided by the number of times that it occurs in the skeleton. The 'percentage presence' of the various anatomical elements was calculated by dividing the number of fragments belonging to each element by the number of times that it occurs in the skeleton and displaying it as a percentage. The number of vertebrae belonging to Gadidae is based on the figures of Barrett (1997) and for herring on this author's personal observation (average 23 abdominal and 33 caudal vertebrae).

The state of preservation was recorded as good, medium or poor. The incidence and location of butchery marks was noted according to the categories of Barrett (1997). Similarly, evidence of damage caused by gnawing, digestion and burning were all recorded. Measurements were taken where possible and generally follow the guidelines of Morales and Rosenlund (1979). The total length of cod was calculated according to the method of Rojo (1986). In addition, size was visually categorized with the aid of the reference specimens. In the interests of comparative studies, the visual size categories follow those used by Cerón-Carrasco (1999) as follows: very small (<150mm), small (150–300mm), medium (300–600mm), large (600–1200mm) and very large (1200–*c*. 2000mm).

All of the floor deposits and environmental samples were processed by flotation using 1mm mesh. The residues

Table 19.11. Juvenile avian bone frequency by age stage and species

Species	**Very young**	**Immature**	**Sub-adult**	**Possible sub-adult**	**Total**
Galliform sp.		5			5
Fulmar			3		3
Small Wader		1	1	5	7
Duck sp.		2		1	3
Herring/Lesser Black-Backed Gull		1	1	1	3
Galliform *cf* Domestic Fowl	2				2
Gull *cf* Great Black-Backed		2			2
Large Grey Goose *Anser* sp.			2		2
Great Black-Backed Gull		1		3	4
Manx Shearwater		1		3	4
Domestic Fowl		1		1	2
Large Duck sp.		1		1	2
Small Passerine		1		1	2
Wader *cf* Golden or Grey Plover		1		1	2
Golden Plover		1			1
Gull sp.		1			1
Medium Wader			1		1
Plover *cf* Golden		1			1
Razorbill			1		1
Puffin				7	7
Cormorant				2	2
Gannet				2	2
Guillemot				2	2
Large Duck *cf* Shelduck				1	1
Large Shearwater *cf* Great				1	1
Oystercatcher				1	1
Small Goose				1	1
Wader/Gull				1	1
Large Bird	1	4			5
Medium + Bird	1	3			4
Very/Large Bird		3			3
Medium Bird		2			2
Large Bird *cf* Galliform		1			1
Large Bird *cf* Large Duck sp.			1		1
Small Bird		1			1
Very Large Bird	1				1
Tiny Bird				1	1
Very Large Bird *cf* Gannet				1	1
Total	**5**	**34**	**10**	**37**	**86**

Table 19.12. Juvenile birds by phase

Phase	0	1	2	3	4	5	6	7	8	9
No. juvenile bones	0	2	6	2	15	10	5	3	4	2
% of total juveniles	0	4	12	4	31	20	10	6	8	5
% of phase NISP	0	6	8	2	7	5	7	3	8	2

were then sieved through 10mm mesh to remove the larger artefacts and ecofacts. The remaining residue was then subdivided and a proportion sorted. The fish assemblage is therefore comprised of three categories of material: that >10mm recovered by sieving on site; that >10mm recovered from the heavy residues after flotation; and a fraction of the material between 10mm and 1mm recovered from the residues. For the purposes of this report, the material has been divided into that <10mm and that >10mm. Occupation floors were divided into 0.50m x 0.50m grid squares for the purposes of excavation and sampling, and fish bones from every second or fourth grid square are included in this analysis**.**

Given the excellent recovery strategy, preservation and condition of the fish remains, it is unlikely that species or body part representation has been biased to a large degree by these factors. The absence of certain body parts is therefore not easily explained unless the assemblage has been biased by the diagnostic properties of certain bones and the recording strategy employed. An example of this is cleithra belonging to gadoid fish which, in a fragmented form, could not usually be distinguished between species, so do not show in the graphs.

Data

A total of 15,625 identifiable fragments of fish bone was recorded, of which 6,901 fragments came from the material >10mm (Table 19.13a) and 8,724 from that <10mm (Table 19.13b).

Fifteen species were identified in the >10mm material:

- herring (*Clupea harengus*),
- eel (*Anguilla anguilla*),
- conger eel (*Conger conger*),
- pollack (*Pollachius pollachius*),
- saithe (*Pollachius virens*),
- cod (*Gadus morhua*),
- hake (*Merluccius merluccius*),
- ling (*Molva molva*),
- ballan wrasse (*Labrus bergylta*),
- mackerel (*Scomber scombrus*),
- bull rout (*Myoxocephalus scorpius*),
- turbot (*Scophthalmus maximus*),
- megrim (*Lepidorhombus whiffiagonis*),
- flounder (*Platichthys flesus*),
- plaice (*Pleuronectes platessa*).

In addition, fragments belonging to cartilaginous and salmonid species are present and both Norway haddock (*Sebastes viviparus*) and gurnard (Triglidae spp) are tentatively identified. A similar range of species was identified in the <10mm material with the addition of the following six taxa: whiting (*Merlangius merlangius*), rockling (*Gaidropsarus/Ciliata* spp), corkwing wrasse (*Crenilabrus melops*), weever (Trachinidae spp), mullet (Muglidae spp) and dab (*Limanda limanda*).

Table 19.13a lists the number of fragments >10mm identified to species for each individual phase of occupation. It is clear that phases 4 and 5 produced most of the fish bone. Considerable amounts came from phases 6 and 7, smaller amounts came from the earliest phases (phases 1, 2 and 3), and only a few fragments from the latest phases of occupation (phases 8 and 9). Overall, the >10mm material is dominated by fragments belonging to cod and cod-family (Merlucciidae/Gadidae spp) fish which comprise 96% of the identifiable assemblage.

Table 19.13b lists species representation in the <10mm material for the various phases. The largest quantity of fish bones came from phase 3 deposits although phase 4 and 7 also produced considerable amounts. In contrast to the >10mm material, phases 5 and 6 produced relatively small amounts of fish bone in this category (as did phases 1 and 2) and phases 8 and 9 a larger proportion. Overall, the <10mm material is dominated by herring which makes up 94% of the identifiable component.

Phase 1

A total of 237 identifiable fragments of fish bone were examined from phase 1 deposits; 218 came from the >10mm material and 19 from the <10mm component. Almost three-quarters (73%) of the >10mm material belongs to cod, pollack and other gadoid fish, and almost a quarter (23%) to herring (Table 19.13a). In addition, one or two fragments belonging to eel, conger eel, wrasse and flounder are present. All of the identified fragments from the <10mm material belong to herring (Table 19.13b).

The frequency of selected body parts (NISP) of cod, pollack and herring is given in Table 19.14. Although the sample is small for material dated to phase 1, bones belonging to both the head and body are present for these three species. The percentage presence of selected elements belonging to cod and pollack in the >10mm material is shown in Figures 19.3–19.4, abdominal vertebrae having the highest frequency for cod, whilst pollack is best represented by the vomer and dentary, both cranial elements. The same calculation for herring in the <10mm material shows that apart from vertebrae, only the maxilla was present (Figure 19.5).

Table 19.13. Fish species representation in: a. >10mm material (NISP); b. <10mm material (NISP)

>10mm	**Phase**																		**Total**	
	1		**2**		**3**		**4**		**5**		**6**		**7**		**8**		**9**			
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Cartilaginous					1	*<1*			2	*<1*									3	*<1*
Clupea harengus	51	*23*	37	*10*	10	*2*	33	*2*	11	*1*	9	*1*	3	*<1*					154	*2*
cf Salmo trutta							1	*<1*											1	*<1*
Salmonidae spp							3	*<1*											3	*<1*
Anguilla anguilla	1	*<1*			2	*<1*	7	*<1*	4	*<1*	1	*<1*	1	*<1*			1	*4*	17	*<1*
Conger conger	2	*1*	1	*<1*			1	*<1*	4	*<1*	3	*<1*	3	*<1*					14	*<1*
Pollachius pollachius	36	*17*	50	*13*	130	*23*	285	*15*	227	*12*	84	*7*	48	*7*	3	*11*	2	*8*	865	*13*
Pollachius virens	4	*2*	10	*3*	28	*5*	49	*3*	62	*3*	35	*3*	16	*2*	3	*11*	3	*12*	210	*3*
Pollachius spp	7	*3*	7	*2*	20	*4*	43	*2*	25	*1*	17	*1*	6	*1*					125	*2*
Gadus morhua	47	*22*	65	*18*	179	*32*	730	*38*	740	*38*	336	*29*	241	*35*	7	*25*	6	*23*	2351	*34*
Merluccius merluccius	3	*1*	5	*1*	7	*1*	59	*3*	138	*7*	51	*4*	65	*9*			6	*23*	334	*5*
Molva molva	1	*<1*	1	*<1*	7	*1*	36	*2*	69	*4*	70	*6*	13	*2*	1	*4*	1	*4*	199	*3*
Merlucciidae/Gadidae spp	61	*28*	192	*52*	158	*28*	662	*34*	615	*32*	481	*42*	271	*39*	14	*50*	7	*27*	2461	*36*
Labrus bergylta					1	*<1*			5	*<1*	17	*1*	4	*1*					27	*1*
Labridae spp	1	*<1*			7	*1*	2	*<1*	10	*1*	25	*2*	8	*1*					53	*<1*
Scomber scombrus									2	*<1*									2	*<1*
cf Sebastes viviparus											1	*<1*							1	*<1*
cf Triglidae spp									1	*<1*									1	*<1*
Myoxocephalus scorpius											1	*<1*							1	*<1*
Scophthalmus maximus													3	*<1*					3	*<1*
Lepidorhombus whiffiagonis													2	*<1*					2	*<1*
Bothidae spp											5	*<1*	1	*<1*					6	*<1*
Platichthys flesus	2	*1*			2	*<1*	1	*<1*	4	*<1*									9	*<1*
Pleuronectes platessa					1	*<1*	1	*<1*	1	*<1*			4	*1*					7	*<1*
Pleuronectidae spp	2	*1*	2	*1*	7	*1*	8	*<1*	12	*1*	11	*1*	4	*1*					46	*1*
Flatfish			1	*<1*					2	*<1*	1	*<1*	2	*<1*					6	*<1*
	Ph 1		**Ph 2**		**Ph 3**		**Ph 4**		**Ph 5**		**Ph 6**		**Ph 7**		**Ph 8**		**Ph 9**		**Total**	
Total identifiable	218		371		560		1921		1934		1148		695		28		26		**6901**	*100*
Unidentifiable	205		310		800		2090		1650		1423		1065		113		34		**7690**	
% identifiable	*52*		*54*		*41*		*48*		*54*		*45*		*39*		*20*		*43*		***47***	
Grand total	**423**		**681**		**1360**		**4011**		**3584**		**2571**		**1760**		**141**		**60**		**14591**	

Table 19.13. continued

<10mm	Phase 1		2		3		4		5		6		7		8		9		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Cartilaginous					3								1	<1					4	<1
Clupea harengus	19	100	8	80	3573	95	1867	96	178	95	34	79	1607	93	506	87	383	85	8175	94
Clupidae spp							1	<1											1	<1
cf Salmo trutta							1	<1							1	<1	3	1	5	<1
Salmonidae spp							3	<1					2	<1					5	<1
Anguilla anguilla					28	1	14	1	3	2			23	1	25	4	13	3	106	1
Conger conger					1	<1							1	<1			1	<1	3	<1
Merlangius merlangius					2	<1	5	<1					1	<1			3	1	11	<1
Pollachius pollachius					25	1	5	<1	3	2			4	<1	10	2	5	1	52	1
Pollachius virens			1	10	14	<1	7	<1			1	2	7	<1	7	1	3	1	40	<1
Pollachius spp					6	<1									1	<1			7	<1
Gadus morhua					5	<1	9	<1	2	1			10	1			2	<1	28	<1
Merluccius merluccius					1	<1	1	<1					2	<1			1	<1	5	<1
Molva molva					1	<1	2	<1					1	<1	3	1			7	<1
Merlucciidae/Gadidae spp			1	10	56	1	21	1	1	1			48	3	15	3	19	4	161	2
Gaidropsarus/Ciliata spp					11	<1											2	<1	13	<1
Crenilabrus melops					1	<1									1	<1			2	<1
Labrus bergylta					1	<1	2	<1			1	2	1	<1					5	<1
Labridae spp					13	<1					1	2	2	<1					16	<1
Trachinidae spp					1	<1	4	<1					1	<1					6	<1
Muglidae spp																	1	<1	1	<1
Scomber scombrus					2	<1													2	<1
cf Triglidae spp																	3	1	3	<1
Myoxocephalus scorpius													4	<1			5	1	9	<1
Limanda limanda															1	<1			1	<1
Platichthys flesus					3	<1	1	<1			7	16			1	<1			12	<1

Table 19.13. continued

Pleuronectes platessa					1	*<1*	2	*<1*											3	*<1*
Pleuronectidae spp					14	*<1*	9	*<1*					5	*<1*	8	*1*	4	*1*	40	*<1*
Flatfish													1	*<1*					1	*<1*
	Ph 1		**Ph 2**		**Ph 3**		**Ph 4**		**Ph 5**		**Ph 6**		**Ph 7**		**Ph 8**		**Ph 9**		**Total**	
Total identifiable	19		10		3762		1954		187		44		1721		579		448		**8724**	*100*
Unidentifiable	5		148		16971		11200		511		109		8113		3020		2132		**42209**	
% identifiable	*79*		*6*		*18*		*15*		*27*		*28*		*17*		*16*		*17*		***17***	
Grand Total	**24**		**158**		**20733**		**13154**		**698**		**153**		**9834**		**3599**		**2580**		**50933**	

All of the fish bone examined from phase 1 deposits came from the pit complex within the sandbank enclosure. Most of the >10mm material (Table 19.13a) came from the various pits themselves, with a few fragments from an organic layer (607) and two postholes (626 and 709) located in the area to the north between the two pit alignments. All of the <10mm material came from a single pit (710) in the eastern alignment. Although the pits were backfilled soon after they were dug (see Chapter 3), it is unlikely that the fish bones represent the accidental incorporation of secondary deposits since the pits were dug into sterile sand on a previously unoccupied area of machair.

Phase 2

A total of 371 identifiable fragments of fish bone >10mm was examined from phase 2 deposits. The majority again belong to cod-family fish (89%), particularly cod and pollack; herring are fairly well represented (10%) with conger eel and flatfish also present (Table 19.13a). The <10mm material comprises 10 identifiable fragments recovered from the northeastern midden; the majority belong to herring (Table 19.13b).

Again, despite the small size of the sample from phase 2 deposits, both cranial and body elements are present for the three major species (Table 19.14). The calculation of percentage presence indicates that the maxilla is the most frequent cod element although posterior abdominal vertebrae are also numerous (Figure 19.3). In contrast to phase 1, pollack is best represented by abdominal vertebrae but this is most likely a reflection of small sample size (Figure 19.4). Herring are represented only by the vomer and vertebrae in the <10mm material (Figure 19.5).

Most of the >10mm material from phase 2 was recovered from fills (618, 573, 582) in the area of the pit complex in the northern part of the sandbank enclosure (Table 19.15). These deposits are stratigraphically later than the pits and postholes and it is possible that they are associated with the construction and use of House 700. Most of the herring bones came from layer 618 and a few other fragments came from the enclosing sandbank and northeastern midden. All of the <10mm material belonging to phase 2 was recovered from the area of the northeastern midden located outside the sandbank enclosure and came from layers 332, 339 and 455.

Phase 3

The predominance (94%) of cod-family fish, particularly cod and pollack, in the >10mm material is clearly visible in phase 3 deposits, which produced 560 >10mm identifiable fish bones (Table 19.13a). The NISP data suggest that cod is more numerous than pollack (Table 19.13a) but the calculation of MNI indicates that a minimum of only four cod compared to six pollack are represented (Table 19.16). Herring is amongst this >10mm material but only constitutes 2%. In addition several fragments belonging to wrasse and one or two fragments belonging to cartilaginous fish, eel, flounder and plaice are present (Table 19.13a).

The <10mm material produced a large quantity (*n*=3,762) of identifiable fragments, 95% belong to herring, representing

Table 19.14. Representation of selected elements for major fish species in: a. >10mm material (NISP); b. <10mm material (NISP)

A i) *Gadus morhua*	**Phase**									**Total**
	1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	
Otolith				15	4					19
Vomer			6	19	22	12	14			73
Premaxilla		2	8	24	35	25	14			108
Maxilla	1	5	7	18	20	18	8	2		79
Dentary		2	5	21	34	18	11			91
Articular	1		2	21	32	28	14			98
Hyomandibular	1	1	4	15	13	12	4			50
Opercular		3	4	24	12	7	4	1		55
Cleithrum		2	2	7	6	8	5		1	31
Posttemporal	1	1	6	23	25	20	9			85
Supracleithrum	1	2	8	19	11	17	5			63
Anterior abdominal vert.	4	4	6	28	33	7	10	1		93
Posterior abdominal vert.	16	25	48	193	228	47	60	1	2	620
Caudal vert.	11	14	41	187	181	40	47	1	3	525
Total	**36**	**61**	**147**	**614**	**656**	**259**	**205**	**6**	**6**	**1990**

A ii) *Pollachius pollachius*	**Phase**									**Total**
	1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	
Otolith			1	1						2
Vomer	2		3	6	4	1			1	17
Premaxilla		1		8	4	3	4			20
Maxilla		1	3	7	10	8	2			31
Dentary	4		14	13	10	7	2		1	51
Articular			1	1	2	2	1			7
Hyomandibular	1		1	1		3				6
Opercular		1	1		1					3
Cleithrum				1	1	2				4
Posttemporal	1		1	4	6	3	1			16
Supracleithrum		1	1	3	2	1				8
Anterior abdominal vert.	2	4	11	18	23	10		1		69
Posterior abdominal vert.	12	31	45	123	90	13	18	1		333
Caudal vert.	7	10	37	75	54	17	16	1		217
Total	**29**	**49**	**119**	**261**	**207**	**70**	**44**	**3**	**2**	**784**

A iii) *Clupea harengus*	**Phase**							**Total**
	1	***2***	***3***	***4***	***5***	***6***	***7***	
Vomer				1				1
Dentary	3	3		6	2			14
Hyomandibular	1							1
Opercular	2	2	3	2	1	1		11
Cleithrum	10	8		5	1			24
Posterior abdominal vert.		2	1	4	1			8
Caudal vert.	25	16	2	13	5	8	3	72
Total	**41**	**31**	**6**	**31**	**10**	**9**	**3**	**131**

Table 19.14. continued

B i) *Gadus morhua*	**Phase**					**Total**
	3	***4***	***5***	***7***	***9***	
Otolith		2			1	3
Vomer	1					1
Posttemporal	2			1	1	4
Posterior abdominal vert.		1		3		4
Caudal vert.	2	6		5		13
Total	**5**	**9**	**0**	**9**	**2**	**25**

B ii) *Pollachius pollachius*	**Phase**						**Total**
	3	***4***	***5***	***7***	***8***	***9***	
Premaxilla	1	1					2
Anterior abdominal vert.	1						1
Posterior abdominal vert.	7	1		2	4	1	15
Caudal vert.	14	3	3	2	6	4	32
Total	**23**	**5**	**3**	**4**	**10**	**5**	**50**

B iii) *Clupea harengus*	**Phase**									**Total**
	1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	
Vomer		1	8	2			3			14
Maxilla	1		13				1	1	1	17
Dentary			6				1		1	8
Articular			12	2				2		16
Hyomandibular			10	2						12
Opercular			12				1		1	14
Cleithrum			16	11			9	2	1	39
Posttemporal			7	3			1	1		12
Anterior abdominal vert.			120	67	6	1	56	14	18	282
Posterior abdominal vert.	7		1191	819	104	19	508	193	121	2962
Caudal vert.	9	6	1667	823	63	13	795	236	194	3806
Total	**17**	**7**	**3062**	**1729**	**173**	**33**	**1375**	**449**	**337**	**7182**

a minimum of 59 individuals (Table 19.16). A small number of fragments belonging to eel, conger eel, whiting, rockling, corkwing wrasse, ballan wrasse, weever, mackerel, plaice and flounder are also present (Table 19.13b).

Bones belonging to both the head and body for the three major species – herring, cod and pollack – are again present (Table 19.14). In the >10mm sample, the calculation of percentage presence indicates that certain cranial and appendicular bones plus posterior abdominal vertebrae belonging to cod are common whilst there are comparatively few caudal vertebrae (Figure 19.3). The survival of pollack bones is extremely patchy: compared to the dentary, only the vomer and posterior abdominal vertebrae are well represented (Figure 19.4). Herring from the <10mm material are represented almost entirely by vertebrae, with a high percentage in all three groups. Cranial and appendicular elements are present but in relatively small numbers (Figure 19.5).

Over half of the >10mm material recovered from phase 3 deposits came from the northeastern midden, a considerable amount from House 700 (mostly the floor layer) and the remainder from the southeastern midden (Table 19.15). Although the sample from the southeastern midden is small, cod makes up a much larger proportion of the material than it does in the northeastern midden (with 50% comprising abdominal vertebrae). The floor and other deposits inside the house produced a greater proportion of caudal vertebrae belonging to cod and pollack than those from the abdominal region opposed to midden material (Figure 19.6).

The majority (83%) of the <10mm material came from the floor of House 700 and the remainder from the

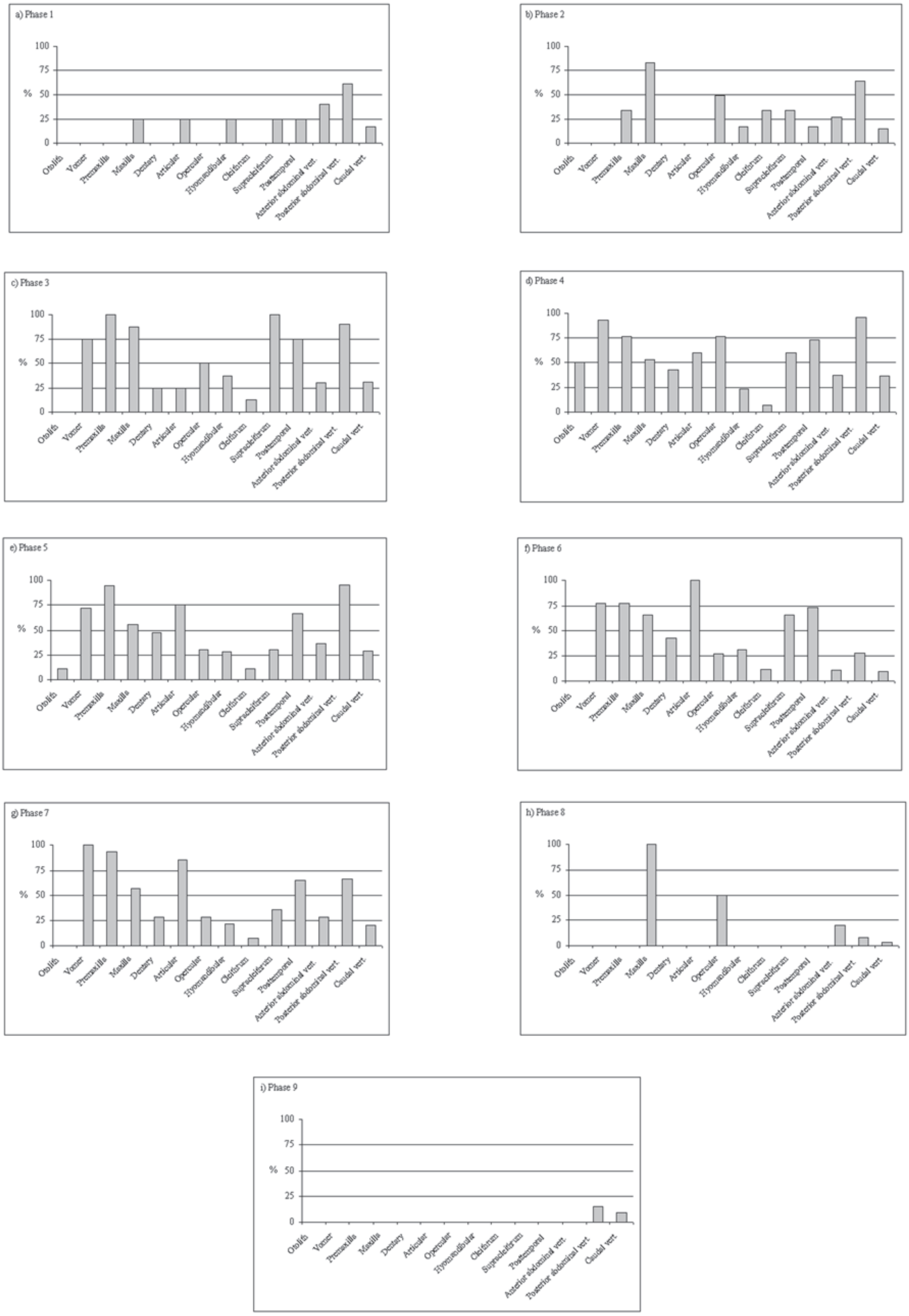

Figure 19.3. Percentage survival of Gadus morhua in >10mm sample

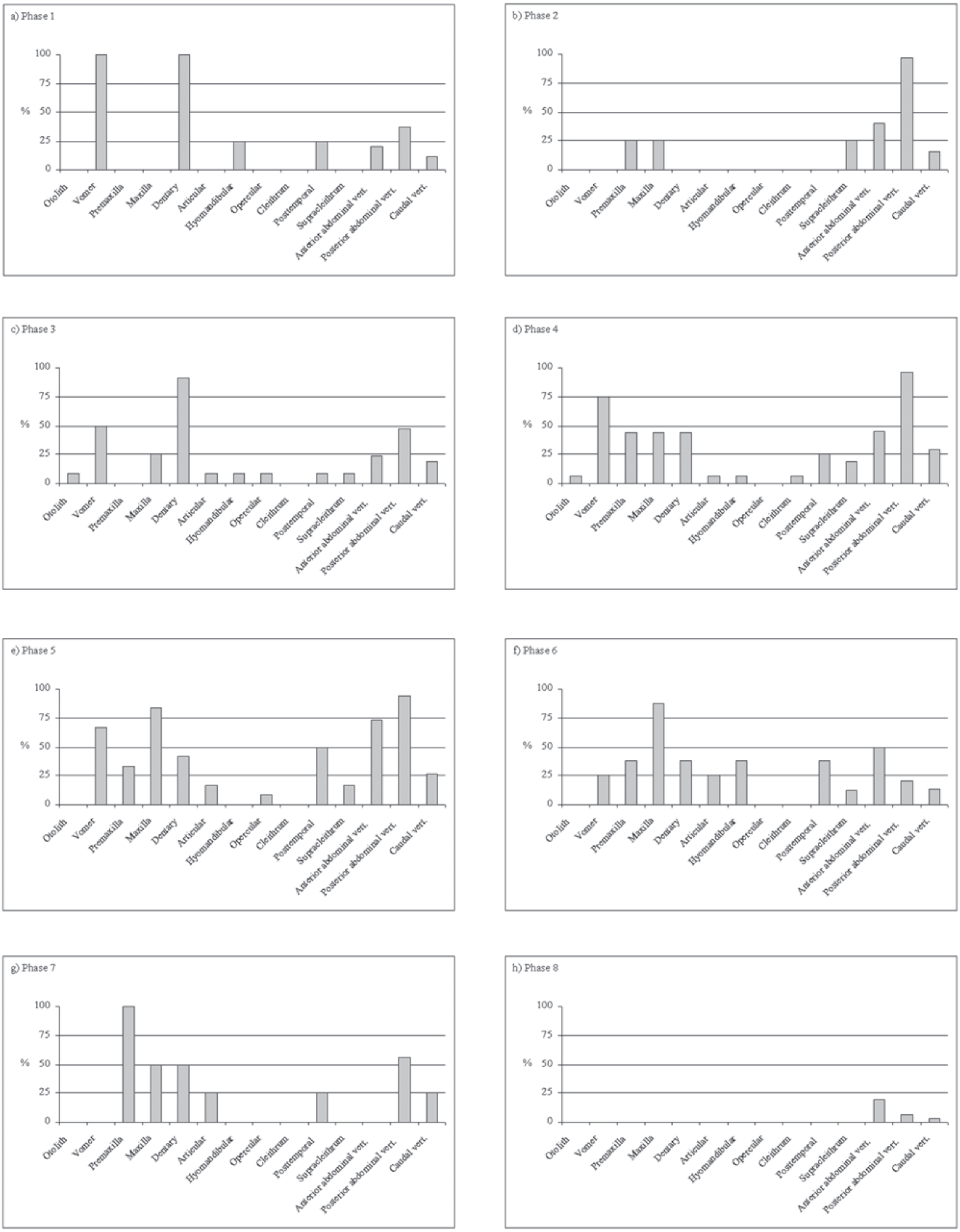

Figure 19.4. Percentage survival of Pollachius pollachius in >10mm sample

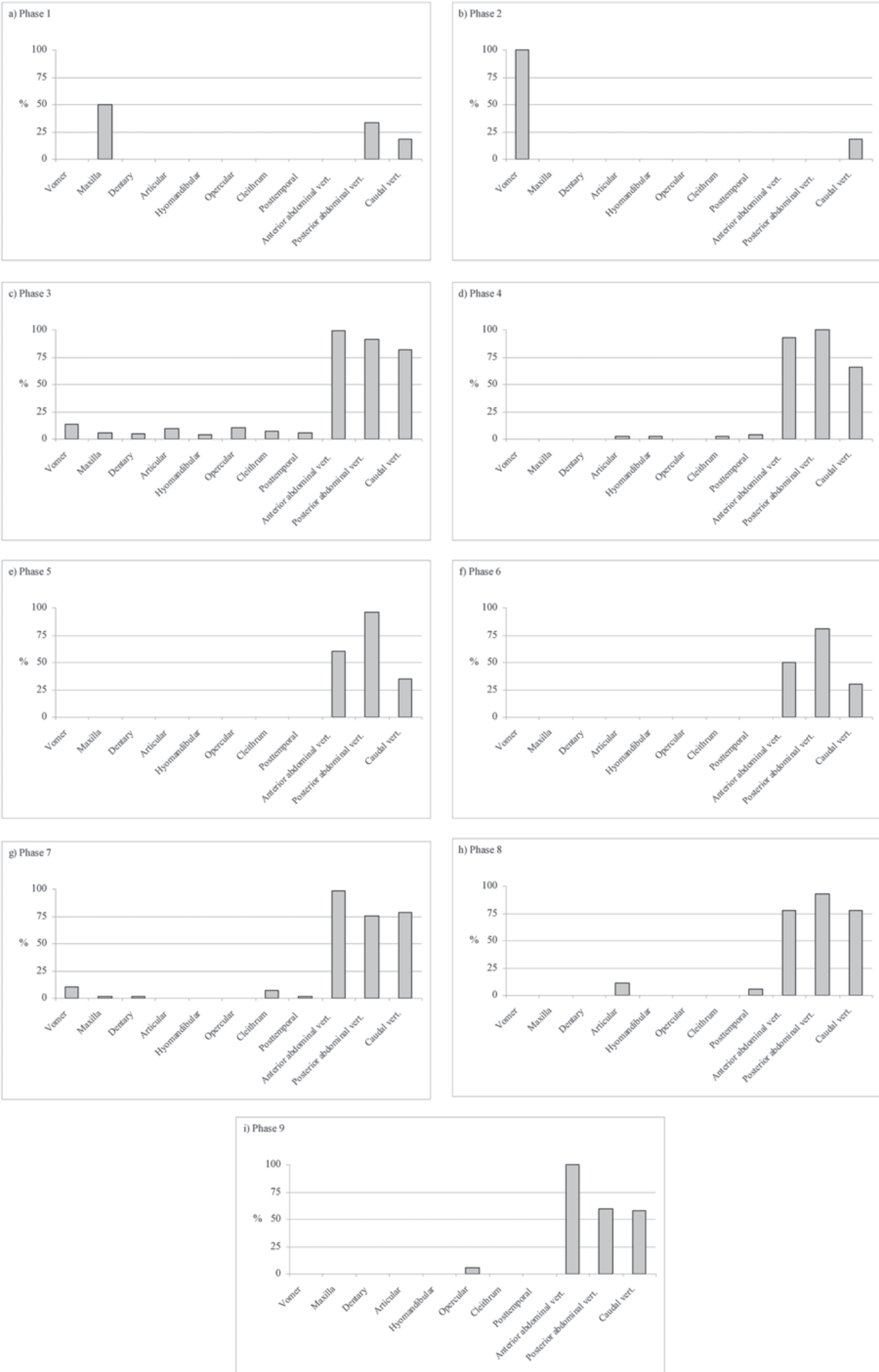

Figure 19.5. Percentage survival of Clupea harengus in <10mm sample

northeastern midden (Table 19.15). Herring dominate both samples but are slightly more numerous in the material from the house floor. Both floor and midden contain a slightly higher proportion of herring caudal vertebrae compared to those from the abdominal region (Figure 19.6).

Phase 4

A large sample containing 1,921 identifiable fragments >10mm was examined from phase 4 deposits and, again, most (97%) belong to cod-family fish, particularly cod and pollack (Table 19.13a). Cod is the most numerous species according to NISP and, to a lesser extent, MNI. The latter indicates that cod are more than twice as numerous as pollack in this phase with a minimum of 15 cod and eight pollack represented (Table 19.16). Apart from herring, odd fragments belonging to salmonid, eel, conger eel, wrasse, plaice and flounder are amongst the material.

Herring continue to dominate in the large sample (*n*=1,954) of material <10mm, comprising 96% of the total NISP value and representing a minimum of 36 individual herring (Tables 19.13b, 19.16). Several of the less frequent taxa are again represented by a few fragments each.

Table 19.14 indicates the continued presence of both cranial and vertebral bones belonging to the three major species. The percentage presence shows that most elements belonging to cod are common apart from the hyomandibular,

Table 19.15. Spatial distribution of fish bones in >10mm and <10mm material (NISP): a. Phase 1; b. Phase 2; c. Phase 3; d. Phase 4; e. Phase 5; f. Phase 6; g. Phase 7; h. Phase 8; i. Phase 9

a) Phase 1	**Pit complex**			**Total**
>10mm material	**Organic layer**	**Pit**	**Posthole**	
	n	**n**	**n**	**n**
Clupea harengus	3	48		51
Anguilla anguilla		1		1
Conger conger		2		2
Pollachius pollachius		35	1	36
Pollachius virens		4		4
Pollachius spp	2	5		7
Gadus morhua	1	46		47
Merluccius merluccius		3		3
Molva molva		1		1
Merlucciidae/Gadidae spp	2	57	2	61
Labrus bergylta		1		1
Platichthys flesus		2		2
Pleuronectidae spp		2		2
Total	**8**	**207**	**3**	**218**

b) Phase 2	**Enclosing sand bank**	**NE midden**	**Contexts above the pit complex**		**Total**	
i) >10mm material	**n**	**n**	**n**	***%***	**n**	***%***
Clupea harengus			37	*11*	37	*10*
Conger conger			1	*<1*	1	*<1*
Pollachius pollachius	3	3	44	*13*	50	*13*
Pollachius virens		1	9	*3*	10	*3*
Pollachius spp	1	1	5	*1*	7	*2*
Gadus morhua	1	2	62	*18*	65	*18*
Merluccius merluccius			5	*1*	5	*1*
Molva molva			1	*<1*	1	*<1*
Merlucciidae/Gadidae spp	5	4	183	*52*	192	*52*
Pleuronectidae spp			2	*1*	2	*1*
Flatfish			1	*<1*	1	*<1*
Total	**10**	**11**	**350**		**371**	

Table 19.15. continued

b) Phase 2	**Contexts above the pit complex**								
ii) >10mm material	**Fill 618**		**Fills 573, 582**		**Organic layer**	**Peat ash**	**Pit**	**Total**	
	n	**%**	**n**	**%**	**n**	**n**	**n**	**n**	**%**
Clupea harengus	33	*25*				3	1	37	*11*
Conger conger						1		1	*<1*
Pollachius pollachius	28	*21*	15	*8*		1		44	*13*
Pollachius virens	4	*3*	5	*3*				9	*3*
Pollachius spp	1	*1*	4	*2*				5	*1*
Gadus morhua	31	*23*	25	*13*	1	3	2	62	*18*
Merluccius merluccius	4	*3*	1	*1*				5	*1*
Molva molva	1	*1*						1	*<1*
Merlucciidae/Gadidae spp	28	*21*	140	*73*	1	7	7	183	*52*
Pleuronectidae spp	1	*1*	1	*1*				2	*1*
Flatfish	1	*1*						1	*<1*
Total	**132**		**191**		**2**	**15**	**10**	**350**	

c) Phase 3	**House 700**		**NE midden**		**SE midden**		**Total**	
i) >10mm material	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Cartilaginous			1	*<1*			1	*<1*
Clupea harengus	6	*4*	4	*1*			10	*2*
Anguilla anguilla			1	*<1*	1	*2*	2	*<1*
Pollachius pollachius	23	*15*	101	*30*	6	*9*	130	*23*
Pollachius virens	9	*6*	15	*4*	4	*6*	28	*5*
Pollachius spp	2	*1*	15	*4*	3	*5*	20	*4*
Gadus morhua	46	*30*	105	*31*	28	*43*	179	*32*
Merluccius merluccius	3	*2*	2	*1*	2	*3*	7	*1*
Molva molva	4	*3*	3	*1*			7	*1*
Merlucciidae/Gadidae spp	48	*31*	89	*26*	21	*32*	158	*28*
Labrus bergylta	7	*5*					7	*1*
Labridae spp	1	*1*					1	*<1*
Platichthys flesus	2	*1*					2	*<1*
Pleuronectes platessa			1	*<1*			1	*<1*
Pleuronectidae spp	3	*2*	4	*1*			7	*1*
Total	**154**		**341**		**65**		**560**	

c) Phase 3	**House 700**		**NE midden**		**Total**	
ii) <10mm material	**n**	**%**	**n**	**%**	**n**	**%**
Cartilaginous	2	*<1*	1		3	
Clupea harengus	2961	*96*	612	*91*	3573	*95*
Anguilla anguilla	27	*1*	1	*<1*	28	*1*
Conger conger	1	*<1*			1	*<1*
Merlangius merlangius	1	*<1*	1	*<1*	2	*<1*
Pollachius pollachius	16	*1*	9	*1*	25	*1*
Pollachius virens	3	*<1*	11	*2*	14	*<1*
Pollachius spp	5	*<1*	1	*<1*	6	*<1*
Gadus morhua	3	*<1*	2	*<1*	5	*<1*

Table 19.15. continued

Merluccius merluccius	1	*<1*			1	*<1*
Molva molva	1	*<1*			1	*<1*
Gaidropsarus/Ciliata spp	11	*<1*			11	*<1*
Merlucciidae/Gadidae spp	32	*1*	24	*4*	56	*1*
Crenilabrus melops	1	*<1*			1	*<1*
Labrus bergylta	4	*<1*			4	*<1*
Labridae spp	10	*<1*			10	*<1*
Trachinidae spp	1	*<1*			1	*<1*
Scomber scombrus			2	*<1*	2	*<1*
Platichthys flesus	1	*<1*	2	*<1*	3	*<1*
Pleuronectes platessa	1	*<1*			1	*<1*
Pleuronectidae spp	11	*<1*	3	*<1*	14	*<1*
Total	**3093**		**669**		**3762**	

d) Phase 4	**House 500 Stage I**		**House 500 construction**	**House 500 forecourt**	**Structure 353 (N room of House 500)**	**NE midden**		**SE midden**	
i) >10mm material	**n**	**%**	**n**	**n**	**n**	**n**	**%**	**n**	**%**
Clupea harengus	11	*2*	2		5	13	*1*	2	*2*
cf Salmo trutta			1						
Salmonidae spp	2	*<1*				1	*<1*		
Anguilla anguilla	2	*<1*				4	*<1*	1	*1*
Conger conger						1	*<1*		
Pollachius pollachius	45	*8*	3		4	218	*19*	15	*12*
Pollachius virens	15	*3*				33	*3*	1	*1*
Pollachius spp	10	*2*				30	*3*	3	*2*
Gadus morhua	188	*34*	11	1	19	453	*39*	58	*47*
Merluccius merluccius	16	*3*			4	36	*3*	3	*2*
Molva molva	27	*5*	1			8	*1*		
Merlucciidae/Gadidae spp	229	*42*	10	1	14	369	*31*	39	*32*
Labridae spp						1	*<1*	1	*1*
Platichthys flesus						1	*<1*		
Pleuronectes platessa						1	*<1*		
Pleuronectidae spp	3	*1*			1	4	*<1*		
Total	**548**		**28**	**2**	**47**	**1173**		**123**	

d) Phase 4	**House 500 Stage I**						
	Floor		**Hearth**		**Passage floor**		**Pit**
ii) >10mm material	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Clupea harengus	7	*2*	1	*1*	1	*1*	2
Salmonidae spp	2	*1*					
Anguilla anguilla	2	*1*					
Pollachius pollachius	21	*7*	4	*6*	18	*10*	2
Pollachius virens	8	*3*	3	*4*	4	*2*	
Pollachius spp	6	*2*	3	*4*	1	*1*	

Table 19.15. continued

Gadus morhua	100	*34*	23	*32*	62	*36*	2
Merluccius merluccius	8	*3*	5	*7*	3	*2*	
Molva molva	15	*5*	7	*10*	5	*3*	
Merlucciidae/Gadidae spp	123	*42*	24	*34*	79	*46*	3
Pleuronectidae spp	2	*1*	1	*1*			
Total	**294**		**71**		**173**		**9**

d) Phase 4	**House 500 Stage I**		**Structure 353 (north room)**		**NE midden**		**SE midden**	
iii) <10mm material	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Clupea harengus	1354	*95*	258	*97*	70	*93*	186	*97*
cf Salmo trutta	1	*<1*						
Salmonidae spp	3	*<1*						
Anguilla anguilla	10	*1*	4	*1*				
Merlangius merlangius	5	*<1*						
Pollachius pollachius	5	*<1*						
Pollachius virens	3	*<1*	2	*1*	1	*1*	1	*1*
Gadus morhua	9	*1*						
Merluccius merluccius	1	*<1*						
Molva molva	2	*<1*						
Merlucciidae/Gadidae spp	15	*1*	2	*1*	2	*3*	2	*1*
Labrus bergylta					1	*1*	1	*1*
Trachinidae spp	3	*<1*			1	*1*		
Platichthys flesus	1	*<1*						
Pleuronectes platessa	2	*<1*						
Pleuronectidae spp	6	*<1*	1				2	*1*
Total	**1420**		**267**		**75**		**192**	

e) Phase 5	**Sand layer cut by House 312**	**House 500 Stage II**	**House 500 forecourt**	**NE midden**		**SE midden**	
>10mm material	**n**	**n**	**n**	**n**	**%**	**n**	**%**
Cartilaginous				1		1	*1*
Clupea harengus				11	*1*		
Anguilla anguilla				4			
Conger conger				1		3	*2*
Pollachius pollachius		3	1	217	*13*	6	*3*
Pollachius virens		1		51	*3*	10	*5*
Pollachius spp				22	*1*	3	*2*
Gadus morhua		11		671	*40*	58	*31*
Merluccius merluccius		2		120	*7*	16	*9*
Molva molva		15	1	44	*3*	9	*5*
Merlucciidae/Gadidae spp		17	4	523	*31*	71	*38*
Labrus bergylta		1		8		3	*2*
Labridae spp						3	*2*
Scomber scombrus				2			

Table 19.15. continued

cf Triglidae spp				1			
Platichthys flesus				3		1	*1*
Pleuronectes platessa	1						*0*
Pleuronectidae spp				10	*1*	2	*1*
Flatfish				1		1	*1*
Total	**1**	**50**	**6**	**1690**		**187**	

f) Phase 6	**Sheds 400 & 406**		**NW midden**		**Preconstruction layers**
i) >10mm material	**n**	**%**	**n**	**%**	**n**
Clupea harengus	9	*2*			
Anguilla anguilla	1	*<1*			
Conger conger	2	*<1*	1	*<1*	
Pollachius pollachius	36	*6*	48	*9*	
Pollachius virens	14	*2*	21	*4*	
Pollachius spp	4	*1*	13	*2*	
Gadus morhua	169	*29*	163	*29*	4
Merluccius merluccius	35	*6*	16	*3*	
Molva molva	38	*7*	32	*6*	
Merlucciidae/Gadidae spp	240	*42*	235	*42*	6
Labrus bergylta	8	*1*	20	*4*	
Labridae spp	10	*2*	4	*1*	
cf Sebastes viviparus	1	*<1*			
Myoxocephalus scorpius	1	*<1*			
Bothidae spp			5	*1*	
Pleuronectidae spp	8	*1*	3	*1*	
Flatfish			1	*<1*	
Total	**576**		**562**		**10**

f) Phase 6	**Sheds 400 & 406**		
	Floor & preconstruction	**Midden**	**Other deposits**
ii) >10mm material	**n**	**n**	**n**
Clupea harengus	8	1	
Anguilla anguilla		1	
Conger conger	2		
Pollachius pollachius	26	7	3
Pollachius virens	6	1	7
Pollachius spp	3		1
Gadus morhua	105	47	17
Merluccius merluccius	5	27	3
Molva molva	28	8	2
Merlucciidae/Gadidae spp	161	67	11
Labrus bergylta	7	1	
Labridae spp	10		
cf Sebastes viviparus			1

Table 19.15. continued

Myoxocephalus scorpius	1		
Pleuronectidae spp	7		1
Total	**369**	**160**	**46**

g) Phase 7	**House 312**		**Outhouse 006**	**NE midden**		**NW midden**	
i) >10mm material	**n**	**%**	**n**	**n**	**%**	**n**	**%**
Clupea harengus	2	*1*				1	*<1*
Anguilla anguilla				1	*1*		
Conger conger				2	*1*	1	*<1*
Pollachius pollachius	14	*6*	7	25	*13*	2	*1*
Pollachius virens	11	*5*	2	3	*2*		
Pollachius spp	4	*2*				2	*1*
Gadus morhua	61	*28*	5	66	*35*	109	*42*
Merluccius merluccius	28	*13*	1	10	*5*	26	*10*
Molva molva	5	*2*		4	*2*	4	*2*
Merlucciidae/Gadidae spp	84	*38*	9	69	*36*	109	*42*
Labrus bergylta	2	*1*		7	*4*	1	*<1*
Labridae spp	2	*1*					
Scophthalmus maximus						3	*1*
Lepidorhombus whiffiagonis	2	*1*					
Bothidae spp				1	*1*		
Pleuronectes platessa	1			3	*2*		
Pleuronectidae spp	2	*1*				2	*1*
Flatfish	1	*<1*				1	*<1*
Total	**219**		**24**	**191**		**261**	

g) Phase 7	**House 312**		**Outhouse 006**		**NE midden**		**NW midden**	
ii) <10mm material	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Cartilaginous			1	*<1*				
Clupea harengus	698	*93*	712	*96*	83	*77*	114	*94*
Salmonidae spp	2	*<1*						
Anguilla anguilla	8	*1*	12	*2*	3	*3*		
Conger conger					1	*1*		
Merlangius merlangius					1	*1*		
Pollachius pollachius	1	*<1*	2	*<1*	1	*1*		
Pollachius virens	3	*<1*	2	*<1*	2	*2*		
Gadus morhua	4	*1*	4	*1*	2	*2*		
Merluccius merluccius	2	*<1*						
Molva molva	1	*<1*						
Merlucciidae/Gadidae spp	26	*3*	4	*1*	12	*11*	6	*5*
Labrus bergylta					1	*1*		
Labridae spp					1	*1*		
Trachinidae spp	1	*<1*						
Myoxocephalus scorpius	4	*1*						

Table 19.15. continued

Pleuronectidae spp	2	*<1*	1	*<1*	1	*1*	1	*1*
Flatfish	1	*<1*						
Total	**753**		**738**		**108**		**121**	

h) Phase 8	**Outhouse 006**		**House 007**	
<10mm material	**n**	**%**	**n**	**%**
Clupea harengus	95	*90*	411	*87*
cf Salmo trutta			1	*<1*
Anguilla anguilla	3	*3*	22	*5*
Pollachius pollachius	1	*1*	9	*2*
Pollachius virens	3	*3*	4	*1*
Pollachius spp	1	*1*		
Molva molva			3	*1*
Merlucciidae/Gadidae spp	2	*2*	13	*3*
Crenilabrus melops			1	*<1*
Limanda limanda			1	*<1*
Platichthys flesus			1	*<1*
Pleuronectidae spp			8	*2*
Total	**105**		**474**	

i) Phase 9	**Huts 084/026 & 075/031**		
	Floor		**Informal hearth**
<10mm material	**n**	**%**	**n**
Clupea harengus	368	*86*	15
cf Salmo trutta	3	*1*	
Anguilla anguilla	12	*3*	1
Conger conger	1	*<1*	
Merlangius merlangius	3	*1*	
Pollachius pollachius	5	*1*	
Pollachius virens	3	*1*	
Gadus morhua	2	*<1*	
Merluccius merluccius	1	*<1*	
Gaidropsarus/Ciliata spp			2
Merlucciidae/Gadidae spp	16	*4*	3
Muglidae spp	1	*<1*	
Triglidae spp	3	*1*	
Myoxocephalus scorpius	5	*1*	
Pleuronectidae spp	3	*1*	1
Total	**426**		**22**

Table 19.16. Minimum number of elements and percentage survival of major fish species a) Gadus morhua; b) Pollachius pollachius; c) Clupea harengus

a) *Gadus morhua*	*n per individual	Phase																	
>10mm sample		1		2		3		4		5		6		7		8		9	
		n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival
Otolith	2							15	50	4	11								
Vomer	1					3	75	14	93	13	72	10	77	7	100				
Premaxilla	2			2	33	8	100	23	77	34	94	20	77	13	93				
Maxilla	2	1	25	5	83	7	88	16	53	20	56	17	65	8	57	2	100		
Dentary	2					2	25	13	43	17	47	11	42	4	29				
Articular	2	1	25			2	25	18	60	27	75	26	100	12	86				
Opercular	2			3	50	4	50	23	77	11	31	7	27	4	29	1	50		
Hyomandibular	2	1	25	1	17	3	38	7	23	10	28	8	31	3	21				
Cleithrum	2			2	33	1	13	2	7	4	11	3	12	1	7				
Supracleithrum	2	1	25	2	33	8	100	18	60	11	31	17	65	5	36				
Posttemporal	2	1	25	1	17	6	75	22	73	24	67	19	73	9	64				
Anterior abdominal vert.	5	4	40	4	27	6	30	28	37	33	37	7	11	10	29	1	20		
Posterior abdominal vert.	13	16	62	25	64	47	90	187	96	224	96	47	28	60	66	1	8	2	15
Caudal vert.	33	11	17	14	14	41	31	181	37	171	29	40	9	46	20	1	3	3	9
MNI		**2**		**3**		**4**		**15**		**18**		**13**		**7**		**1**		**1**	

b) *Pollachius pollachius*	*n per individual	Phase																	
>10mm sample		1		2		3		4		5		6		7		8		9	
		n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival	n	% survival
Otolith	2					1	8	1	6										
Vomer	1	2	100			3	50	6	75	4	67	1	25					1	100
Premaxilla	2			1	25			7	44	4	33	3	38	4	100				
Maxilla	2			1	25	3	25	7	44	10	83	7	88	2	50				
Dentary	2	4	100			11	92	7	44	5	42	3	38	2	50				

Table 19.16. continued

Articular	2					1	8	1	6	2	17	2	25	1	25			
Hyomandibular	2	1	25			1	8	1	6		0	3	38					
Opercular	2					1	8			1	8							
Cleithrum	2							1	6		0							
Posttemporal	2	1	25			1	8	4	25	6	50	3	38	1	25			
Supracleithrum	2			1	25	1	8	3	19	2	17	1	13					
Anterior abdominal vert.	5	2	20	4	40	7	23	18	45	22	73	10	50			1	20	
Posterior abdominal vert.	16	12	38	31	97	45	47	123	96	90	94	13	20	18	56	1	6	
Caudal vert.	32	7	11	10	16	36	19	74	29	52	27	17	13	16	25	1	3	
MNI		**2**		**2**		**6**		**8**		**6**		**4**		**2**		**1**		**1**	

c) Clupea harengus	***n per individual**	**Phase**																	
<10mm sample		**1**		**2**		**3**		**4**		**5**		**6**		**7**		**8**		**9**	
		n	**% survival**	**n**	**% survival**	**n**	**% survival**	**n**	**% survival**	**n**	**% survival**	**n**	**% survival**	**n**	**% survival**	**n**	**% survival**	**n**	**% survival**
Mesethmoid	2					1	1	1	1										
Frontal	2					5	4	1	1										
Prootic	2	1	50			12	10	1	1					2	4			1	
Vomer	1			1	100	8	14							3	11				
Basioccipital	1					41	69	19	53					15	54			7	
Parasphenoid	1					2	3	1	3										
Maxilla	2	1	50			7	6							1	2			1	
Dentary	2					6	5							1	2			1	
Articular	2					11	9	2	3							2	11		
Quadrate	2					10	8	1	1										
Metaptyergoid	2					4	3							2	4	3	17		
Ceratohyal	2					16	14	2	3					1	2	1	6		

Table 19.16. continued

Epihyal	2					8	7	1	1							1	6	2	11
Hyomandibular	2					5	4	2	3										
Hypohyal	2					1	1												
Urohyal	2					16	14	3	4					7	13				
Interopercular	2					3	3												
Opercular	2					12	10											1	6
Preopercular	2					13	11												
Subopercular	2					17	14	2	3										
Cleithrum	2					8	7	2	3					4	7				
Postcleithrum	2					16	14	1	1										
Posttemporal	2					7	6	3	4					1	2	1	6		
Anterior abdominal vert.	2					117	99	67	93	6	60	1	50	55	98	14	78	18	100
Posterior abdominal vert.	21	7	33			1131	91	756	100	101	96	17	81	442	75	175	93	113	60
Caudal vert.	33	6	18	6	18	1592	82	780	66	58	35	10	30	728	79	230	77	172	58
Hypural	2					51	43	8	11	2	20			17	30	8	44	1	6
MNI		**1**		**1**		**59**		**36**		**5**		**1**		**28**		**9**		**9**	

cleithrum, anterior abdominal and caudal vertebrae (Figure 19.3). The sample of pollack is small but vomer, dentary and posterior abdominal vertebrae appear to be most numerous (Figure 19.4). The herring assemblage from the <10mm material is again dominated by vertebrae (Figure 19.5).

Over half of the >10mm material recovered from phase 4 deposits came from the northeastern midden and over a quarter from House 500 Stage I (Table 19.15). Most of the material from House 500 Stage I was recovered from the house floors (504, 520, 531, 539, 544 and 548) and entrance passage floor (565) although smaller amounts came from its hearth (555) and various pit deposits (Table 19.15).

There are fewer pollack bones than cod bones in the house material, with a slightly higher percentage of pollack in the northeastern midden material, but again this could be a reflection of sample size. A comparison of anatomical representation in the floors and midden indicates that abdominal vertebrae belonging to cod comprise a smaller proportion of the remains recovered from midden deposits than they do floor deposits (Figure 19.6). In contrast, cod caudal vertebrae make up a slightly larger proportion of the midden deposits.

Most of the <10mm material came from the floors of House 500 Stage I (504, 520, 544, 548), with smaller amounts from the floor of the north room (366, 370, 409), the southeastern and northeastern middens (Table 19.15). Midden deposits contain a higher proportion of caudal vertebrae belonging to herring than abdominal vertebrae whereas the converse is seen for floor deposits (Figure 19.6).

Phase 5

Another large sample comprising 1,934 fragments of fish bone >10mm was examined from deposits dated to phase 5. Cod remains the dominant species (38%), followed by pollack (12%), with gadoid fish representing 97% overall. A minimum of 18 individual cod and six pollack are represented (Table 19.16). Again, a number of minor taxa are also present (Table 19.13a).

The <10mm component of the phase 5 assemblage is small compared to phases 3 and 4, with only 187 fragments identifiable (Table 19.13b). The relative frequency of herring (95%) remains high, representing a minimum of five individuals (Table 19.16); apart from herring, only eel, pollack and cod were identified.

Cranial and vertebral elements belonging to cod, pollack and herring are again all present in the >10mm material (Table 19.14) whereas, with the exception of a dentary belonging to a gadid, the <10mm material contains only vertebral elements (Table 19.14; gadids not shown). The calculation of percentage presence for the >10mm material indicates that several cranial elements, post-temporals and post-abdominal vertebrae belonging to cod are common (Figure 19.3). With regard to pollack, the maxilla and anterior and posterior abdominal vertebrae are relatively numerous (Figure 19.4). Of those herring elements selected for this calculation, only vertebrae are present with those from the posterior abdominal region being most frequent (Figure 19.5).

Most of the >10mm material recovered from phase 5 came from the northeastern midden (Table 19.15), with only a relatively small amount retrieved from the southeastern midden and House 500 Stage II. The fish bones from the house were retrieved from a variety of context types – pits (523, 524, 541), floors (522, 535), a posthole (510) and a pathway fill (416) – but the quantities are too small to warrant detailed analyses of species and body part representation. The <10mm component came from the northeastern midden and the floor of House 500 Stage II (535). There is greater variation between the proportions of herring abdominal and caudal vertebrae recovered from floor and midden layers, with the former comprised largely of those from the abdomen (Figure 19.6).

Phase 6

A total of 1,148 identifiable fragments were examined from the >10mm material dated to phase 6 (Table 19.13a). The proportion of both cod (29%) and pollack (7%) is lower (with a minimum of 13 cod and 4 pollack represented) than in phases 3, 4 and 5 although, overall, the assemblage is still dominated by gadoid fish (92%). A single fragment of bull rout is present amongst the less frequent taxa.

Herring continue to dominate the <10mm material in this small sample (n=44), representing a minimum of just one individual; a few fragments belonging to flounder and one each to pollack and wrasse are also present (Tables 19.13b, 19.16).

As in the previous phase, both cranial and vertebral elements belonging to cod, pollack and herring are present in the >10mm material whilst the <10mm material contains only herring vertebrae (Table 19.14). Most cranial elements belonging to cod show a high percentage presence, particularly the articular compared with the neighbouring dentary; of the appendicular elements supracleithra and post-temporals are numerous whilst all categories of vertebrae are under-represented (Figure 19.3). Apart from the maxilla and dentary, there are relatively few pollack elements and anterior abdominal vertebrae show a higher survival than the other vertebrae (Figure 19.4). As in the previous phase, of the <10mm herring bones selected for this calculation, only vertebrae are present with posterior abdominal elements the most numerous (Figure 19.5).

Most of the >10mm material belonging to phase 6 came from Sheds 400 and 406 and the northwestern midden (Table 19.15). That retrieved from the sheds came predominantly from a pre-construction layer (394) and a floor (369) with smaller amounts from midden layers (396, 398) and a variety of other deposits (364, 403, 404; Table 19.15). Cranial elements belonging to cod and pollack comprise a greater proportion of the material recovered from both floor and midden layers than in previous phases, at the expense of caudal and abdominal vertebrae (Figure 19.6). The <10mm material was recovered exclusively from the floors of Sheds 400 and 406.

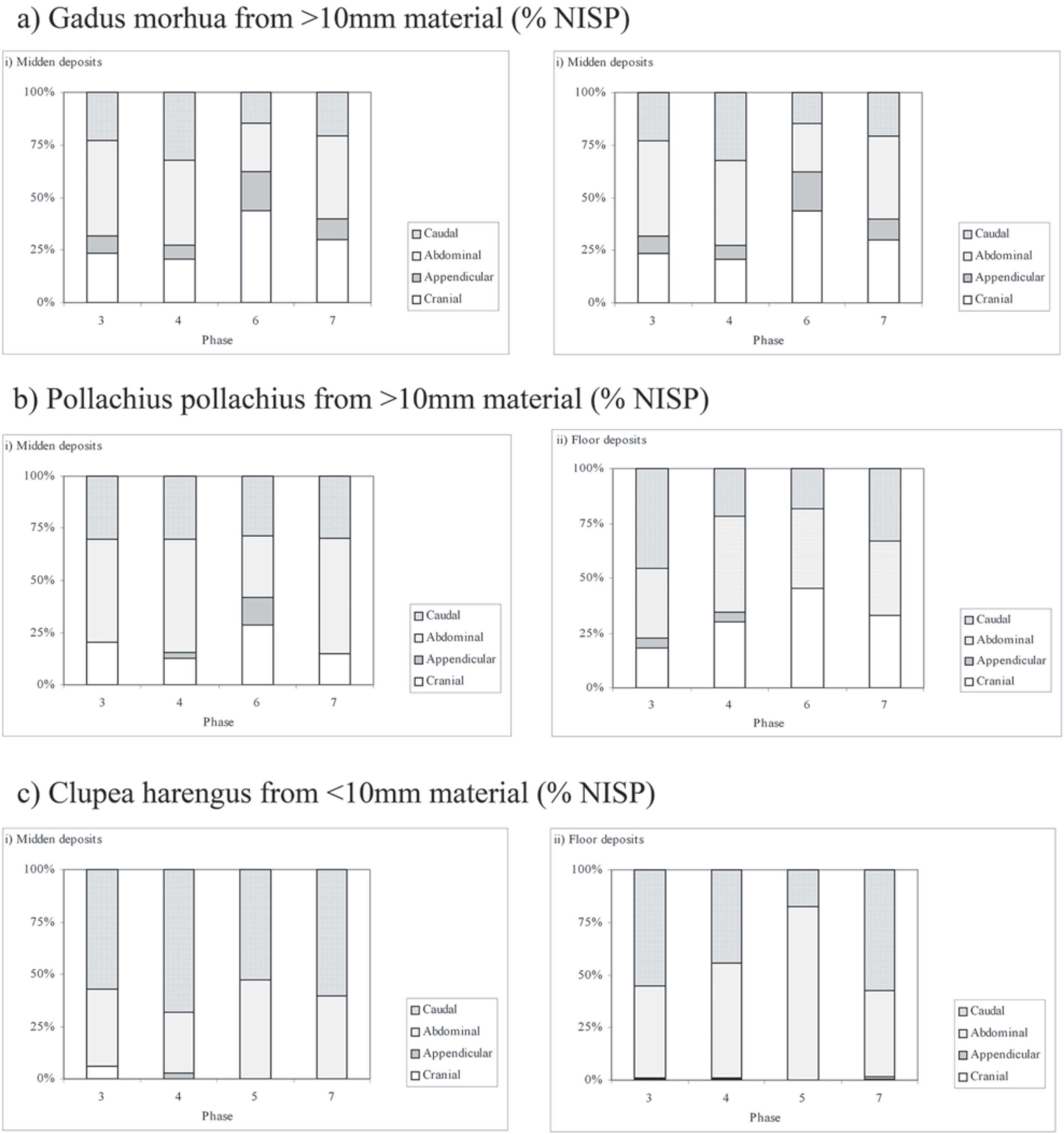

Figure 19.6. Comparison of fish body part representation in floor and midden deposits

Phase 7

The >10mm sample (*n*=695) is somewhat smaller than those examined from the previous three phases but gadoid fish continue to make up the bulk of the assemblage (95%), with cod the most numerous species according to NISP (Table 19.13a), representing a minimum of seven individuals compared to two pollack (Table 19.16). For the first time, hake (9%) is more numerous than pollack (7%) and turbot and megrim are amongst the trace taxa.

The <10mm sample is larger, comprising 1,720 identifiable fragments. Herring continue to dominate (93%) the NISP count with at least 28 individuals represented (Tables 19.13b, 19.16). Bull rout is again present.

Cod, hake and pollack from the >10mm sample and herring in the <10mm material are all represented by both cranial and vertebral elements (Table 19.14). Vomer is the only element belonging to cod to show a high percentage presence, whilst the premaxilla is the most numerous of the pollack bones (Figures 19.3–19.4). As in previous phases, the most common herring elements in the <10mm sample are the three categories of vertebrae (Figure 19.5).

Most of the >10mm material came from the

northwestern midden, from the hearth and floor layers (204, 205, 206) of House 312 and its passage, and from the northeastern midden including the fill of a pit (037), with a small (n=24) amount from the floor (060) of Outhouse 006 (Table 19.15). There is some variation in species frequency between the deposits; the highest incidence of cod occurs in the northwestern midden (42%) and the lowest in House 312 (28%); pollack is almost absent in the northwestern midden and relatively numerous in the northeastern midden (13%).

Both floor and midden layers comprise lower proportions of cod and pollack cranial bones than they did in phase 6, almost returning to levels seen for earlier phases (Figure 19.6). A smaller proportion of caudal vertebrae belonging to cod were found in midden layers compared to floor layers, with the opposite apparent for vertebrae from the abdominal region. The majority of the <10mm sample came from the floor of House 312, and the floor and hearths (059, 083) of Outhouse 006, with much smaller amounts coming from the northeastern (including pit fill 037) and northwestern middens (Table 19.15).

Phase 8

Only 28 fragments of fish bone were examined from the >10mm component dated to phase 8 and consequently the results of analysis must be treated with caution (Table 19.13a). All of the remains belong to gadoid fish, with cod continuing as the most numerous species.

The <10mm sample is larger, comprising 579 identified specimens (Table 19.13b); herring are slightly less well represented (87%) than in most of the earlier phases with a minimum of nine individuals identified (Table 19.16). Eel comprises 4% of this material, higher than in any other phase.

The presence of cod maxilla, opercular and vertebral bones indicates that all parts of the cod skeleton are represented (Table 19.14). Both cranial and vertebral elements belonging to herring are present in the <10mm sample although vertebrae predominate.

With the exception of a single fragment recovered from the floor of Outhouse 006 (sample 004), all of the >10mm component dated to phase 8 came from a construction layer (097) in House 007, its floor and hearth deposits (063, 064, 065, 091, 092), and an entrance passage floor and construction layer (108, 110). Most of the <10mm material was retrieved from the floor and hearth deposits in House 007 although a considerable amount (n=105) also came from the floor of Outhouse 006 (Table 19.15).

Phase 9

A similar quantity (n=26) of >10mm material was examined as for the previous phase (Table 19.13a). Apart from a single fragment belonging to eel, all the remains again belong to gadoid fish, with cod and hake equally represented according to NISP, and cod and *Pollachius* spp according to MNI. Again, the <10mm component is significantly larger, comprising a total of 448 identified specimens, but there are few changes in species representation, with a single appearance of mullet. A minimum of nine individual herring are represented (Table 19.16).

There are no cranial bones belonging to cod and just a single one belonging to pollack amongst the >10mm material but this may be a function of sample size (Table 19.14). In the <10mm material, cranial and vertebral bones belonging to herring are present although, again, the calculation of percentage presence indicates the virtual dominance of vertebral elements, particularly those from the anterior abdominal region (Table 19.14, Figure 19.5).

All of the material examined from phase 9 was recovered from the structures within the ruined House 007 (Table 19.15). That comprising the >10mm component, and most of the <10mm material, came from the floors (030, 044, 070) whilst a small (n=22) amount of the <10mm sample was recovered from the huts' informal hearths (011, 042, 056, 057).

Taphonomy

Preservation

The high proportion of identifiable material in the >10mm assemblage (average 47%) and in the <10mm sample (average 17%) is an indication of the extremely good preservation afforded by the calcareous shell sand from which the assemblage was recovered. Otoliths belonging to both cod and hake occur only in phases 4 and 5; being composed of aragonite, they are less stable than bone which is composed of hydroxyapatite (Carlson 1988) but are most likely to survive in alkaline conditions, particularly waterlogged cesspits or deep refuse pits where (acid) rain cannot percolate (Van Neer *et al*. 2002). Their survival in certain phases only may therefore reflect the variable nature of the depositional environment.

Condition

Almost all the fish bone from all phases of occupation is in good condition (Table 19.17) and a large proportion of elements are over 75% complete (Table 19.18).

Disposal

Identification and density-related preservation bias cannot explain the anomalous patterning visible for some elements. Caudal vertebrae belonging to cod are noticeably under-represented; these are generally both identifiable to species level and fairly robust, therefore their under-representation most probably reflects the existence of differential disposal practices.

With the exception of the small samples from phases 1 and 2, herring remains from the <10mm material are almost entirely composed of vertebrae. Cranial and appendicular elements are virtually absent in the deposits throughout phases 3–9 and even in the large samples from phases 3, 4 and 7 extremely under-represented. In addition, caudal vertebrae are generally less well-represented than are those from the abdominal region. Again, given the excellent conditions for preservation and recovery, and the

Table 19.17. Condition of the fish bone (%)

Size	Condition	Phase								
		1	2	3	4	5	6	7	8	9
		%	%	%	%	%	%	%	%	%
>10mm	Good	99	100	99	98	100	100	99	93	100
	Medium	1		1	2			1	7	
	Poor									
<10mm	Good	100	100	100	100	100	100	100	100	100
	Medium				<1			<1		
	Poor									

Table 19.18. Completeness of the fish bone (%)

Size	Completeness	Phase								
		1	2	3	4	5	6	7	8	9
		%	%	%	%	%	%	%	%	%
>10mm	100%	3	4	4	3	1	3	2	4	4
	>75%	60	40	49	49	49	35	43	32	38
	50–75%	23	13	27	25	29	37	30	29	19
	25–50%	11	39	9	11	13	14	16	29	23
	<25%	3	5	11	12	8	11	8	7	15
<10mm	100%			2	1			1	2	2
	>75%	63	30	77	82	90	86	70	76	73
	50–75%	16	60	8	5	2		8	9	8
	25–50%	21		10	9	7	12	17	11	12
	<25%		10	3	3	1	2	3	2	4

identifiable nature of herring cranial bones and vertebrae, other explanations must be sought.

Butchery

A number of bones from the >10mm material possess evidence of butchery in the form of cut-marks or chop-marks but, in general, the incidence is low (Table 19.19). A few bones from <10mm material from phases 4 and 8 possess cut-marks and a single bone from phase 4 has been chopped but, again, the proportion is low. The anatomical location of cuts and chops in the >10mm material is given in Table 19.19b. It shows that butchery marks are most often seen on cod appendicular elements, at least during phases 3, 4 and possibly 5. This is also apparent during phase 4 for pollack.

Gnawing

Few bones from the >10mm material display evidence of having been gnawed (Table 19.20) although a considerable proportion of the phase 3 remains and quite a few bones from phases 4, 7 and 8 in the <10mm material are crushed in a manner suggestive of having been digested (Butler and Schroeder 1998), by humans or canids.

Burning

With the exception of the phase 8 material, a very small proportion of the >10mm material possesses evidence of burning (Table 19.21). A much larger proportion of the <10mm material has evidence for burning, particularly that from phases 3, 7, 8 and 9. Most of the burnt bone from phase 3 came from the house floor, that from phase 7 from the floors and hearths of both the house and outhouse, and that from phases 8 and 9 from the house and hut floors and hearths.

Pathology

A few Gadidae specimens display pathological abnormalities, mostly in the form of hyperostosis. Although the causes of hyperostosis are not understood, most occurrences are believed to be relatively harmless neoplasms that do not influence the vitality of the fish (von den Driesch 1994). Also of interest is the evidence of trauma visible on a cleithrum, which may have been caused by penetration of the bone by a sharp implement, followed by healing.

Temporal changes

Figure 19.7 presents graphically the relative frequency of the major gadoid fish according to phase. It is clear that cod is the most frequent species throughout phases 1–8; pollack make up a high proportion in the early phases (1 and 2) but decrease throughout phases 3 to 7. In the late phases (8 and 9), although pollack and saithe appear to make significant contributions at the expense of cod, this is likely to be a function of the small sample sizes.

Alongside the decrease in the proportion of pollack, there is an increase in their size over time (Figure 19.8), with an increasing proportion of the remains >10mm belonging to large-sized fish (600–1200 mm). The size of saithe, cod, and hake remains fairly constant through time, with most bones belonging to large fish although slightly higher proportions of medium-sized fish (300–600 mm) occur in phase 3 deposits. Very large ling (>1200 mm) start to appear in phase 4 at the expense of smaller specimens; in phases 6 and 7 no bones belonging to medium-sized ling are present and almost half belong to very large fish. Phases 8 and 9 contain the remains of large ling only, although, again, this may be a product of sample size.

The size of cod was also estimated from the height of the premaxilla (Rojo 1986) and this measurement confirms

Table 19.19. Butchery marks on fish bone: a. Incidence of butchery marks (NISP); b. Anatomical location of butchery observed on members of Gadidae (NISP)

A i) >10mm material	**Type**	**Phase**								**Total**	**%**
Species		***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***		
Clupea harengus	Cut			1						1	*1*
Conger conger	Cut							2		2	*14*
Pollachius pollachius	Cut				2	3				5	*1*
	Chop			1	3					4	*<1*
	Cut/Chop				1					1	*<1*
Gadus morhua	?				3	2	1			6	*<1*
	Cut	1	2	2	3	3		1		12	*1*
	Chop	1	1	6	4	7		1		20	*1*
Merluccius merluccius	?				1	1				2	*1*
	Cut					1				1	*<1*
	Chop							1		1	*<1*
Molva molva	?						1			1	*1*
	Chop				2	1				3	*2*
Merlucciidae/Gadidae spp	?	1		1	2	5		2		11	*<1*
	Cut			1	1	1	3		1	7	*<1*
	Chop	1		1	4	4	4			14	*1*
	Cut/chop			1						1	*<1*
Scophthalmus maximus	Cut							1		1	*33*
Bothidae spp	Chop						1			1	*17*
Pleuronectidae spp	Cut					1				1	*2*
Total		**4**	**3**	**14**	**26**	**29**	**10**	**8**	**1**	**95**	
% of total identified		*2*	*1*	*3*	*1*	*1*	*1*	*1*	*4*		

A ii) <10mm material	**Phase**	
	4	***8***
Cut	5	2
Chop	1	
Total	**6**	**2**
% of total identified	*<1*	*<1*

Table 19.19. continued

B i) *Gadus morhua*

Type	Phase 1	2	3	4	5	7	Total
1		1	2		2		5
2	1				1		2
3		1	6	5	3		15
4		1					1
5				1	1	1	3
6					3		3
8						1	1
Total	**1**	**3**	**8**	**6**	**10**	**2**	**30**

B ii) *Pollachius pollachius*

Type	Phase 3	4	5	Total
3	1	4	1	6
6		2	2	4
Total	**1**	**6**	**3**	**10**

B iii) *Merluccius merluccius*

Type	Phase 5	7	Total
3	1		1
6		1	1
Total	**1**	**1**	**2**

B iv) *Molva molva*

Type	Phase 4	5	Total
2		1	1
4	1		1
5	1		1
Total	**2**	**1**	**3**

(1=mouth; 2=skull, 3=appendicular region; 4=ventral anterior abdominal vertebrae; 5=dorsal posterior abdominal/caudal vertebrae; 6=ventral posterior abdominal/caudal vertebrae)

Table 19.20. Incidence of gnaw-marks on fish bones (NISP)

i) >10mm material	**Phase**						**Total**
	1	***3***	***4***	***5***	***6***	***7***	
Canid/human	1	1	7	6	11	1	27
Rodent		1					1
?	1		6	1	3		11
Total	2	2	13	7	14	1	39
% of total identified	*1*	*<1*	*1*	*<1*	*1*	*<1*	

ii) <10mm material	**Phase**								**Total**
	1	***2***	***3***	***4***	***5***	***7***	***8***	***9***	
Canid/human	2	2	538	36	3	39	17	9	646
Rodent			1						1
Human								1	1
?			2	1				1	4
Total	2	2	541	37	3	39	17	11	652
% of total identified	*11*	*20*	*14*	*2*	*2*	*2*	*3*	*2*	

the large size of the majority of individuals in all phases (Table 19.22), although the presence of some small and medium-sized gadoid fish is indicated by the remains in the <10mm material (Table 19.23).

Most of the herring remains belong to small-sized fish (150–300mm), although during recording it was noted that most of those in the small and medium categories are approximately 300mm, rendering the division somewhat arbitrary. That said, a higher proportion of those herring remains categorized as medium-sized (300–600mm) occurs in the material dated to phases 4 and 6 (Figure 19.9). A very small proportion of very small herring (<150mm) was recovered from phases 3, 4, 7, 8 and 9, but only those from the last phase are sufficient in number to be displayed graphically.

Spatial patterns

There are some noteworthy differences between floor and midden deposits that may be the result of disposal

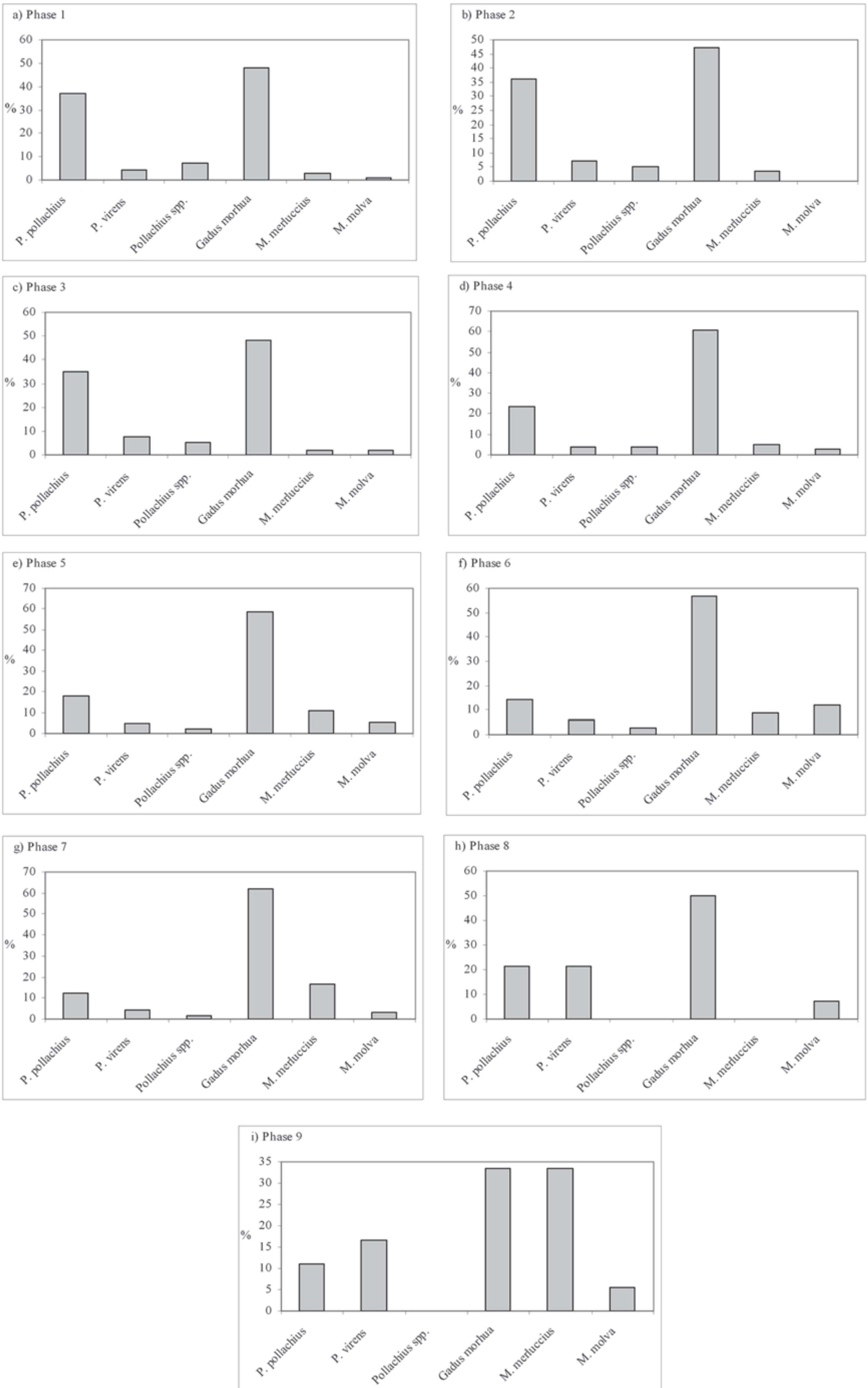

Figure 19.7. Relative frequency of members of Gadidae in >10mm material according to phase

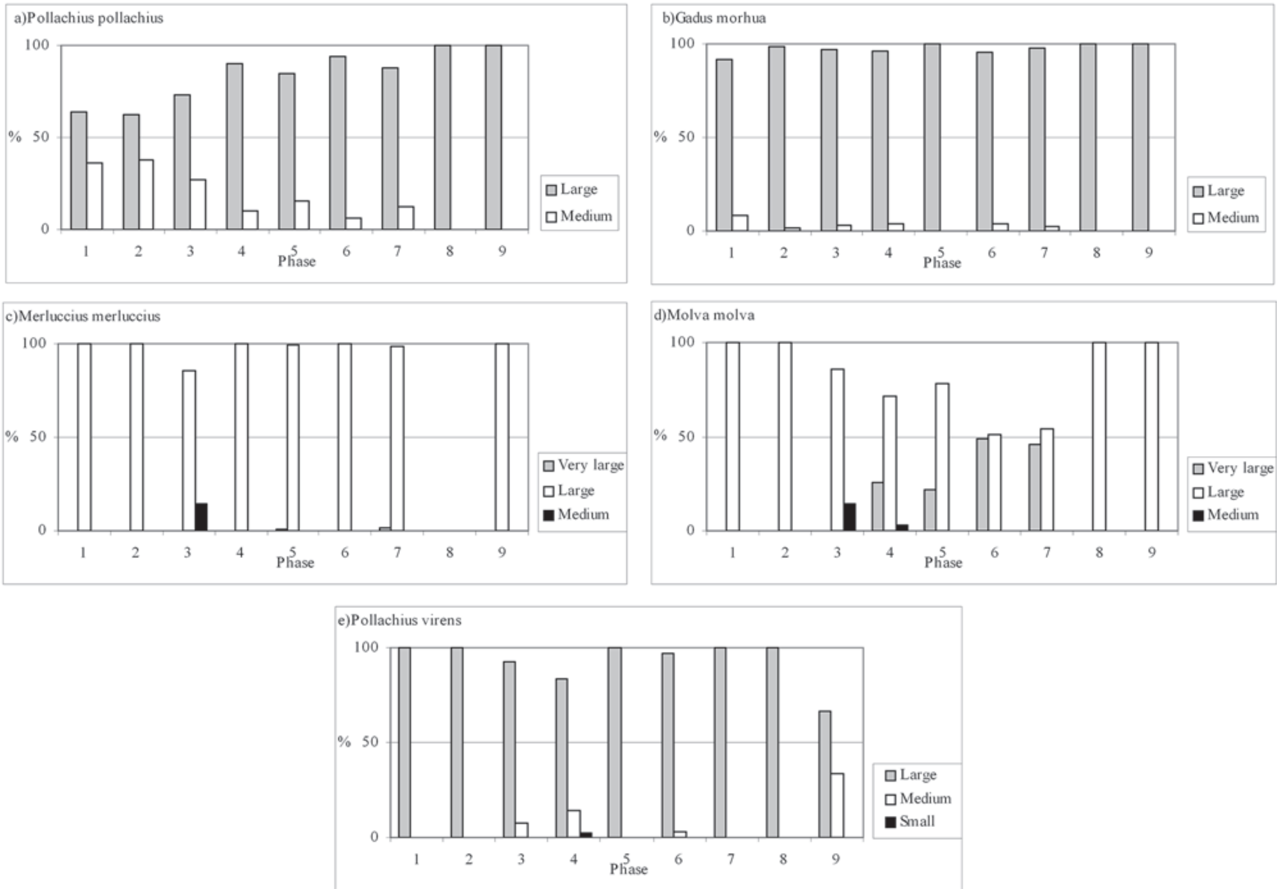

Figure 19.8. Estimated size of Gadidae in >10mm samples

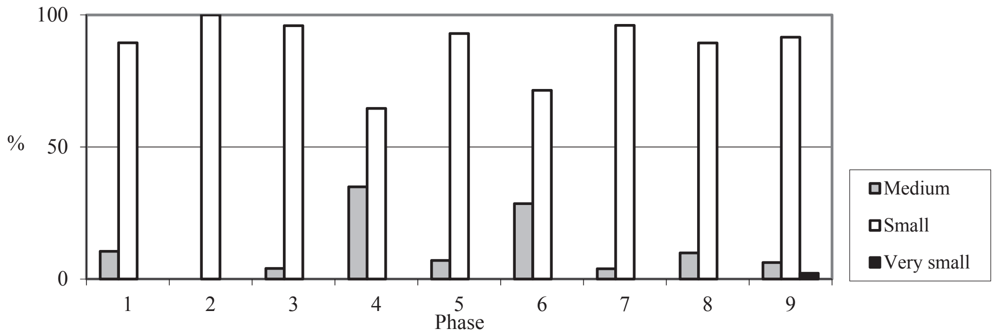

Figure 19.9. Estimated size of Clupea harengus in <10mm samples

practices. In almost all phases, a higher incidence of caudal vertebrae belonging to gadoid fish was apparent in floor deposits whereas a higher incidence of abdominal vertebrae was found in the middens. This pattern suggests that tail bones remained with the flesh until the fish was prepared for consumption whereas the abdominal bones might have been removed prior to this, perhaps as part of the drying process.

This is, however, not confirmed by the material from the southeastern midden during phase 3, which appears to consist of material originally derived from the hearth and yet also contained a particularly high proportion of cod abdominal vertebrae. In contrast, the converse is apparent in the southeastern midden during phase 4. The southeastern midden also contained a high proportion of cod in both phases and a comparatively low proportion of pollack in phase 3. The latter species can be seen to be relatively common in the northeastern midden in phases 3, 4 and 7 (Table 19.15). In phase 7 deposits the highest representation of cod occurred in the northwestern midden.

Discussion and interpretation

Phases 1 and 2

Although the remains of herring, cod and pollack are present during the earliest phases of initial construction and occupation (phase 1 and 2), they are not present in sufficient numbers to suggest large-scale fish consumption,

Table 19.21. Incidence of burning on fish bones (NISP)

i) >10mm material	**Phase**							**Total**
	1	***2***	***4***	***5***	***6***	***7***	***8***	
Calcined			1			1	11	13
Black		1	2	7	2	4	2	18
Brown			11	2		6		19
Partly burnt					2	2	1	5
?	1		8					9
Total	1	1	14	9	4	13	14	55
% of total identified	*<1*	*<1*	*1*	*<1*	*<1*	*2*	*50*	

ii) <10mm material	**Phase**							**Total**
	2	***3***	***4***	***5***	***7***	***8***	***9***	
Calcined		178	11		131	20	6	346
Black		312	167	8	527	69	64	1147
Brown		507	104	1	50	71	14	747
Partly burnt	1	4	7		3	1	7	23
?		9	25		16	1	10	61
Total	1	1010	314	9	727	162	101	2324
% of total identified	*10*	*27*	*16*	*5*	*42*	*28*	*23*	

Table 19.22. Gadus morhua: proportion of fish in size categories estimated from height of premaxilla (after Rojo 1986)

Phase	**n**	**Size category**	**%**
2	2	Large	*100*
3	8	Large	*100*
4	15	Medium	*7*
		Large	*86*
		Very large	*7*
5	19	Medium	*11*
		Large	*89*
6	16	Large	*69*
		Very large	*31*
7	11	Medium	*9*
		Large	*91*

Table 19.23. Estimated size of members of Gadidae in <10mm samples

<10mm samples	**Size category**	**Phase**								**Total**	***%***
		2	***3***	***4***	***5***	***6***	***7***	***8***	***9***		
Pollachius pollachius	Large		5				1	7	1	14	*27*
	Medium		16	5	3		1	3	3	31	*60*
	Small		3				2		1	6	*12*
Pollachius virens	Medium		4				2	1		7	*18*
	Small	1	9	6		1	4	6	3	30	*75*
	Very small		1	1						2	*5*
Gadus morhua	Large		3	4	2		7		1	17	*61*
	Medium		2	2			3		1	8	*29*
	Small			3						3	*11*
Merluccius merluccius	Large		1	1			2		1	5	*100*
Molva molva	Large		1	1			1			3	*43*
	Medium			1						1	*7*
	Small							3		3	*10*
Total		**1**	**48**	**29**	**5**	**1**	**25**	**20**	**14**	**143**	

and nor do they indicate that intensive exploitation of fish was taking place. This may be a consequence of the types of contexts excavated, particularly in the absence of floor and midden deposits. Despite the absence of sieved floor deposits, it is, however, interesting that herring make up a considerable proportion of the remains in the larger (>10mm) category of material as this hints at their relative importance to the inhabitants of the site.

Fishing and fish processing at Cille Pheadair

During the middle phases of occupation (phases 3–7), the large quantities of fish bone belonging to cod-family fish and herring recovered from occupation floors and middens leave little doubt that off-shore fish were brought to the settlement in considerable numbers. Of the few sites dating to this period excavated in the Western Isles, Mound 3, Bornais (Ingrem 2005), the Udal (Serjeantson n.d.), and Rosinish (Roisinis; *ibid.*) all produced evidence for the exploitation of large cod-family fish and herring. This contrasts with evidence from the Northern Isles where, although numerous sites have been excavated, there is little evidence for the exploitation of herring at this time (Cerón-Carrasco 1998; Barrett 1997; Nicholson 1997; Rackham 1996; Jones 1995; Sellar 1982; Wheeler 1976).

Given the proximity of the farmstead to the coast, it is extremely likely that the fish were caught locally. The probability that people living at Cille Pheadair were engaged in such activities is supported by the Old Statistical Accounts of Scotland compiled during 1791–99 which state that, in the parish of Canisby 'every farmer is a fisherman and every fisherman a farmer' (cited in Jones 1995), indicating that even in later times fishing was not a specialized activity. The variable size of the gadoid fish also suggests that they were caught locally (Enghoff 2000: 123).

All of the fish present could have been caught from the shore but the numbers involved and the overwhelming predominance of large gadoid fish, especially of cod compared to saithe, more likely result from the deliberate targeting of offshore waters (see Barrett *et al*. 2001: 146). A comparison of Iron Age and Viking/Norse-period sites in the Northern Isles indicates a greater emphasis on the exploitation of open water in the later period, thought to reflect the immigration of Norse colonists (*ibid.*: 152).

The fish assemblage recovered from the Iron Age site of Dun Vulan, South Uist (Parker Pearson and Sharples 1999) is composed predominantly of immature saithe, typical of other Iron Age assemblages in the region (Finlay 1991; Cerón-Carrasco 1999). This was interpreted as representing exploitation of the immediate environment, and the evidence from Cille Pheadair, Bornais and the Udal points toward a change in fishing practice in the Western Isles in the Norse period similar to that described by Barrett *et al*. (2001) for the Northern Isles, with an increased emphasis on the exploitation of offshore waters.

The presence of whole fish would be expected at a site where fish were being caught and eaten in a fresh form (attested by the presence of elements belonging to all parts of the skeleton of both gadoid fish and herring). If fish were caught in sufficient quantities to produce a surplus, given the short time it takes the flesh to deteriorate, it is extremely likely they would be processed for storage and later consumption.

Such activities are well documented for gadoid fish in more recent times (Martin 1995; Fenton 1978a; Hodgson 1957; Cutting 1956) and evidence from contemporary archaeological sites suggests that cod-family fish were being processed in the Northern Isles (Barrett 1997; Cerón-Carrasco 1998) at around this time. Both lines of evidence indicate that large white fish were decapitated through the appendicular region and documentary sources provide many examples of the fillets being preserved by wind-drying and/or salting.

At Cille Pheadair, caudal vertebrae belonging to cod and pollack are generally less numerous than those from the abdominal region; this suggests that fish tails were not generally present and that the meat from this part of the fish was not usually available for consumption. According to traditional Scottish processing methods of the nineteenth century, 22 caudal vertebrae were left in the fillets to provide rigidity (Ross 1882). The Cille Pheadair evidence indicates either that most fish did not arrive at the site whole, or that the tail of the fish was separated from the head and abdomen with the tail transported elsewhere.

At Roberts Haven, Caithness (Barrett 1997), a similar pattern was evident in an assemblage comprised predominantly of fish heads and other waste material, including the anterior portion of the spine. Barrett *et al*. (2000: 16) believe this pattern represents removal of the anterior part of the spine along with the head prior to drying or salting at the processing site, whilst the relative scarcity of appendicular elements is thought to result from cleithra being left in the fillets to provide rigidity (Barrett *et al*. 1997). In contrast, the high incidence of appendicular elements at Cille Pheadair suggests either their removal from the fillets prior to storage or export, or that decapitation took place posterior to the appendicular region, perhaps allowing the retention of a portion of the abdomen for consumption. A similar pattern was evident in the cod assemblage recovered from house floors at nearby Mound 3, Bornais, leading to the latter conclusion (Ingrem n.d.). It raises the possibility that this type of fish butchery might have been a regional (Uist or Hebridean) tradition.

Whether the meat surrounding the anterior portion of the spine was kept for consumption or whether some abdominal vertebrae were removed from the fillets prior to storage or export from the site is difficult to ascertain. Caudal vertebrae are most numerous in floor deposits, lending support to their having remained with the flesh until the point of cooking and/or consumption. In contrast, the predominance of abdominal vertebrae in midden deposits implies removal prior to this.

The majority of cut- and chop-marks are seen on bones from the appendicular region, particularly supracleithra and post-temporals, as is the case at sites in the Northern Isles. However, in this case, the butchery dataset is small and, as with decapitation, severing the vertebral column does not necessarily leave traces on the bones. A few caudal vertebrae display cut- or chop-marks and it is quite possible that large fish were divided into portions for cooking, consumption and processing purposes, perhaps head, abdomen and tail; after all, a large amount of flesh is present on a metre-long fish.

The heads of large cod-family fish also contain a considerable amount of meat which would be difficult to access in a raw state and, by its nature, difficult to preserve

but the meat of the head is easily removed once cooked and makes good soup, whereas fillets are better suited to other methods of cooking (personal observation). At Beachview, Birsay, Orkney, in an attempt to reconcile the evidence from a domestic midden, Rackham (1996) suggested that the meat from cod heads might have been consumed whilst fillets were dried for storage and trade. Given the domestic nature of Cille Pheadair and the types of contexts excavated, it is therefore not inconceivable that meat from large fish heads was eaten fresh, whilst fillets from the abdominal region might have been eaten either fresh or in a cured form, or exported from the site.

Historically, and to the present day, whole herring are pickled in brine or smoked to aid preservation. It was not until the thirteenth century that improved methods of preservation were discovered when 'the fishermen of Biervliet, on the West Schelde, in the southern part of Zeeland near Vlissingen, were the first to clean the insides of the fish in order to preserve them better' (Cutting 1956: 57–8). At Cille Pheadair the virtual absence of heads and some caudal bones belonging to herring suggests that cleaning, gutting and primary butchery took place elsewhere, quite possibly at the landing site. The low number of head bones raises the possibility that the majority of herring arrived in a decapitated form, possibly without the tip of the tail.

The virtual absence of herring heads was also apparent at the Norse-period settlement at Mound 3, Bornais; here, however, the bones came solely from house floor deposits, leading to the suggestion that the heads probably ended up in nearby (as yet unlocated) middens (Ingrem 2005). This now seems doubtful in the light of the evidence from midden deposits at Cille Pheadair which suggests it might have been common practice to remove the heads of herring and even, possibly, the tip of the tail prior to cooking and, possibly, prior to transporting the fish from the seashore to local farmsteads.

Although there is no evidence for the export of herring from the Cille Pheadair farmstead itself, this does not mean it was not taking place. If the herring at Cille Pheadair were cleaned and decapitated at the landing site, it is conceivable that surplus fish were also processed there. As previously discussed, in historical times whole herring were pickled in brine and therefore no evidence for this activity would be expected to remain. White fish can be effectively preserved simply by salting and drying in the sun or wind but herring, because of its fattiness, normally require both salting and covering in brine to prevent them rapidly turning rancid (Cutting 1956: 53). Herring for local consumption are still sun- and wind-dried without salt in Iceland (*ibid.*: 53), however, and therefore probably were in the past. Although no mention can be found of the actual process involved, when applied to cod-family fish (stock-fish), decapitation is followed by cleaning, sometimes splitting, and hanging by the tail on drying racks (*ibid.*: 175).

If herring were dried for local consumption without salt, the possibility exists that they were processed in a similar manner to the stock-fish. The waste would have accumulated at the landing or processing site and perhaps was later collected and used as manure. As late as the nineteenth century, the guts of herring caught by the many boats owned by the firm of Hay & Ogilvy of Lerwick were kept for manure (Cutting 1956: 104). Fish waste would have been a valuable source of fertilizer, given the fragile machair soils of South Uist (see also isotopic analysis of pigs, and discussion of their diet, in Chapter 18).

No evidence can be found for there being a standard practice of decapitation prior to smoking, and it can only be assumed that, as the evidence suggests, this was a local practice. Whether wind-dried or smoked, possibly with the aid of salt, it is unlikely that herring were sufficiently well preserved to withstand lengthy storage and long-distance transport.

Phases 5, 6 and 7

The frequency of herring declines dramatically in phase 5 despite the presence of floor deposits, whilst that of cod and pollack remains stable. This is, however, likely to reflect the poor condition of the house floor, which could not be excavated using the project's intensive 0.5m-square grid sampling system, rather than being a reflection of the virtual cessation of herring fishing.

In phase 6, there is a decline in the quantity of cod and pollack and, at the same time, a slightly different pattern of body part representation is apparent. This decline in abundance is probably related to the changing function of the farmstead and the short-lived duration of the phase; however, body part representation hints at a change in processing technique**.** The decline in the relative abundance of abdominal vertebrae suggests this region of the fish was no longer retained with the head; instead it probably remained with the tail, thereby increasing the size of fillets available for processing and perhaps export. Of course, given the question of the nature of the site's use at this time (see Chapter 8) – the insubstantial sheds suggest the site was used only sporadically – the presence of cod-family fish heads may simply represent processing waste and perhaps the use of the site as a processing station. If this were the case, then it would seem that it was not standard practice to remove abdominal vertebrae from the fillets prior to export, as appears to have been the case at sites in the Northern Isles (Barrett *et al*. 1999).

During phase 7 abdominal vertebrae belonging to cod are slightly more numerous than in phase 6 but do not reach previous levels, suggesting that some fillets still consisted of both abdomen and tail portions. This implies that whitefish fillets might have become important trade commodities. In Arctic Norway, there is evidence for intensive dried fish production extending back into the Iron Age and it has been suggested that the chieftains traded surplus stockfish as well as the better documented prestige goods (Perdikaris 1999). The relative frequency of herring increases to previous levels, unsurprising given that the farm mound was once again occupied.

Phases 8 and 9

The gradual decline in the relative frequency of herring, cod and pollack throughout the remainder of the site's occupation may be a function of sample size reflecting, at least partly, both regular sweeping of the house floors and the absence of excavated midden deposits. Herring are still present in sufficient quantity to suggest they were regularly eaten. Unfortunately, the processing techniques applied to large cod-family fish cannot be considered for these latest phases because the sample of gadoid fish is too small to offer information on butchery and processing practices.

Fish ecology and fishing practices

It is clear that people living at the Cille Pheadair farmstead were, to some extent, dependent upon the sea for the resources it offered throughout the site's occupation. The habitat preferences of fish clearly dictate the technology required and the amount of risk involved in their capture.

- Herring are pelagic fish generally found in offshore waters from the surface to depths of 200m; young herring, however, inhabit shallow water and may concentrate close to the banks on which they spawned (Wheeler 1969; 1978).
- Large pollack and hake also tend to live mainly offshore but may move inshore during the summer months, although according to Wheeler (1978), prior to over-fishing, hake might have lived in shallow water all year round.
- Large saithe are found mainly in mid-water whilst cod are found from the shoreline to 600m although, again, larger fish are usually captured in deeper waters as are ling (*ibid.*).

The major species recovered from Cille Pheadair are, therefore, marine fish known to generally inhabit offshore waters; the large number of fish recovered from the site is a clear indication that these fish were deliberately targeted. It is, therefore, highly likely that the Norse inhabitants practised off-shore fishing.

The minor species – cartilaginous fish, conger eel, whiting, rockling, wrasse, weever, mackerel, Norway haddock, gurnard, bull rout, turbot, megrim, mullet, plaice and dab – are also marine fish which can be found, at least occasionally, in inshore waters (Wheeler 1978). None are present in sufficient number to suggest they were deliberately targeted and, as such, most are likely to represent occasional fishing from the shore or incidental catches. The small and very small fish such as rockling, weever and some eel may well represent the gut contents of larger fish. The remainder – common eel, salmonid, and flounder – can be found in both marine and freshwater environments. In the absence of purely freshwater species, there is no definite evidence that inland lochs and other water sources were being exploited for fish but this remains a possibility.

According to ethnographic accounts from the Northern Isles, large cod-family fish can be caught from the shore at suitable, rocky locations known as 'craig seats' by using a hook and line with limpet for bait (Cerón-Carrasco 1998). However, another possible strategy is the use of small boats similar to those of traditional Norse design known as 'yoles' or 'fourern' and long fishing lines with multiple hooks which allowed large gadids, mackerel, conger eel, dogfish and rays to be caught close to the shore (*ibid.*). Long lines take two forms, the små (small) and the big or great; the latter were baited at sea and set in deeper water to catch the cod, ling, skate, turbot and halibut (Martin 1995).

If there was a shoal of herring not far offshore, it is likely that gulls and gannets diving to catch them would signal their presence and allow local fishermen the opportunity to catch considerable numbers from inshore waters by scooping them out with a 'poke net' (Dale Serjeantson pers. comm.), described by Martin (1995) as a bag attached to a hoop and suspended from a long pole. Generally though, herring shoal in different places at different times, and in varying numbers (Wheeler 1978), and such unpredictable fish had to be found before they could be caught – thereby introducing an element of hunting to the activity (Martin 1995).

Fishing was generally carried out at night and, until the late nineteenth century, most was done from open boats using drift-nets; it is not known when these came into use but Serjeantson (unpublished interim report) believes their use probably pre-dates the early Middle Ages. The general size and frequency of herring and cod at Cille Pheadair suggest that offshore waters were deliberately targeted – an environment that would have involved a high level of risk and technology compared with freshwater or inshore fishing.

This type of fishing has been inferred from the high frequency of large gadoid fish recovered from sites in the Northern Isles (Cerón-Carrasco 1998; Nicholson 1997; Sellar 1982; Wheeler 1976) and was suggested for the Western Isles as a result of evidence recovered from Mound 3, Bornais (Ingrem 2005). Herring are thought to have shoaled on the edge of the continental shelf to the west of South Uist and in the Minch to the east, in spring or summer (Harden Jones 1968). The larvae of fish spawned to the west are carried a considerable distance to the north by the Atlantic current whereas many of the young fish spawned in the Minch probably grow up in the lochs and bays along the coastline (*ibid.*). The virtual absence of very small herring in the assemblage at Bornais led to the suggestion that the herring were being caught on the continental shelf to the west (Ingrem 2005).

The Dutch exploited offshore waters in the Minch during the fifteenth century (Boyd and Boyd 1996: 65) and it is therefore quite possible that the Norse period inhabitants were doing the same. According to Boyd and Boyd, during the nineteenth century herring shoaled in the sheltered sea lochs in winter and the exposed off-shore waters in summer, with those on the west coast occurring earliest. However, overall the large numbers of herring at Cille Pheadair and the scarcity of small, young fish suggest most probably originated in offshore waters.

As previously mentioned such intensive exploitation of offshore waters involves high risk and capital investment in boats, nets and lines; it might therefore have been undertaken at the level of the community rather than the family. There is evidence for other Norse-period sites in the vicinity: two are located in immediate proximity (200m to the south and 100m to the north) to the Cille Pheadair Norse-period farmstead (although little remains of either because of coastal erosion), and in nearby Dalabrog (Daliburgh), two small Norse-period settlement mounds exist, probably also representing single farmsteads (Parker Pearson 2012c).

Another reason to postulate community involvement is the romance and mystique surrounding the 'hunting' of herring described by Martin (1995) as resulting from 'the departure from land into the uncertainties of sea and darkness'. A wait of several days, even weeks, could ensue before a catch was made, during which time the crew became bonded by their mutual purpose 'to hunt the herring to its death' (*ibid*.).

Conclusion

There is evidence from the fish remains to suggest that the inhabitants of the Cille Pheadair farmstead were most probably both farmers and fishers who were engaged in the high-risk exploitation of offshore waters on a seasonal basis in order to obtain a supply of protein. They appear to have consumed decapitated herring in considerable numbers whilst generally only eating certain parts of the cod-family fish. What happened to the presumably surplus white fish fillets, whether whole or comprising only the tail region, cannot be ascertained but they might have been traded with a neighboring community or given to a local chief in tribute, perhaps in a cured form.

The evidence from Cille Pheadair supports findings from the nearby site of Mound 3, Bornais and, taken together, this evidence from South Uist implies that different practices existed in the Western and Northern Isles with regard to fishing and fish consumption. Firstly, in contrast to the Northern Isles, herring appear to have been the primary target of fisherfolk and their capture involved the deliberate exploitation of offshore waters. Secondly, these herring were generally beheaded, and possibly split and wind-dried or smoked, possibly at the landing site before the fish arrived at the point of consumption. Finally, there is some evidence for the existence of a local tradition involving decapitation posterior to the appendicular region and, almost certainly, retention of part of the abdomen of large cod-family fish for local consumption. A change in emphasis from the exploitation of inshore waters during the Iron Age period to offshore waters in the Norse period is apparent and, in this respect, the Western and Northern Isles appear to have followed a similar trajectory.

19.3 The marine mollusca

H. Smith and M. Parker Pearson

As at every prehistoric and ancient settlement mound along the machair of the Western Isles, marine shells formed a small but highly visible component of the archaeological deposits at Cille Pheadair. All the excavations along South Uist's machair by the SEARCH and Cardiff University

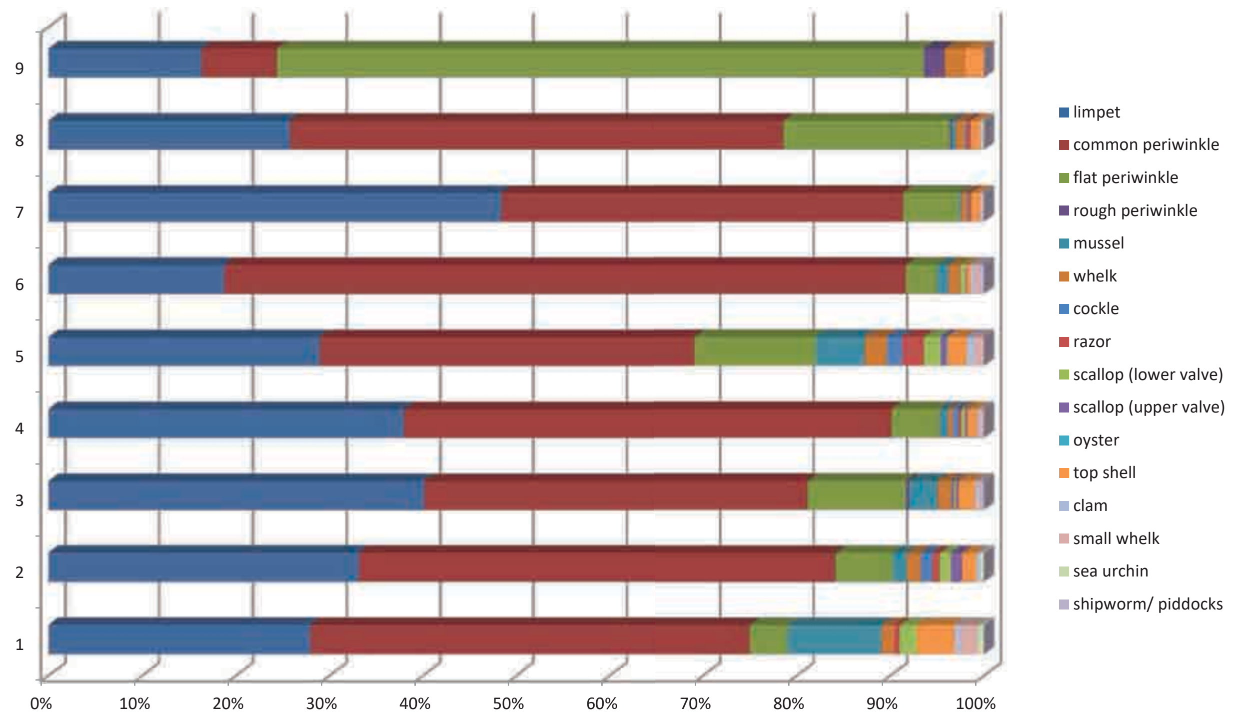

Figure 19.10. Percentage presence of marine mollusc species by phase

projects entailed sampling to recover marine shells using a standard strategy (Sharples 2005c):

1. All species were retrieved from the heavy residues produced during flotation of the environmental samples and counted.
2. Species other than the most common (*i.e.* not winkles or limpets) were recovered whenever they were observed during excavation.
3. A large sample for flotation was taken when a particularly large and dense shell layer was excavated; such samples were additional to the sampling by grid square.

To ensure a standard level of sampling for this analysis, only those marine mollusca retrieved in >10mm residues from the sorted flotation samples have been analysed. Common periwinkle (*Littorina littorea* L.; 51% of total assemblage; known in common speech as winkles) and limpet (*Patella vulgata* L.; 36%) are easily the most common species, followed by flat periwinkle (*Littorina obtusta* L.; 7%).

The other twelve species represented by their shell remains were all recovered in only small quantities of less than 2% (Table 19.24; Figure 19.10). They consist of (in declining proportions) mussel (*Mytilus edulis* L.), topshell (*Gibbula cineraria* L.), common whelk (*Buccinum undatum* L.), cockle (*Cerastoderma edule* L.), dog whelk (*Nucella lapillus* L.), scallop (*Pecten maximus* L.), razor shell (*Ensis* spp), clam (Nuculidae spp), rough periwinkle (*Littorina saxitilis* L.), shipworm (Terenidae spp), sea urchin (Echinoidea spp) and oyster (*Ostrea edulis* L.).

Proportions of shellfish species varied through time at Cille Pheadair. Mussels were most frequent in phase 1, followed by phases 5 and 3. Phase 5 is anomalous because the proportion of winkles is below average whilst the minor species are proportionally above average. This seeking-out of the minor species may indicate dietary stress at that time. In phase 6, the proportion of winkles rises sharply to 73%, well above the Cille Pheadair site average of 51% and more in line with the proportions of this species recorded at Bornais Mound 3 (Sharples 2005c: 146–8). The proportion of limpets rises during the first four phases; limpets then decline in phases 5 and 6 before rising to nearly 50% in phase 7. Thereafter they decline sharply in the final two phases of occupation.

The very small proportion of cockles (*Cerastoderma edule* L.) is interesting, given their large numbers in exposed midden deposits at the nearby Middle Iron Age wheelhouse of Kilpheder (Lethbridge 1952). As discussed in Chapter 1, the freshwater loch immediately east of the Cille Pheadair Norse site was originally a seawater cockle strand but this is likely to have been transformed into a brackish or freshwater inland loch by the Norse period.

The proportions of marine species at Cille Pheadair show a similar but not identical pattern to that at Norse Bornais (Mound 3; Sharples 2005c: 146–8), where common periwinkle (winkle) was significantly more common than limpet. Limpets had been the main preference in Late Iron

Table 19.24 Distribution of marine mollusc species by phase

Phase	**limpet**	**common periwinkle**	**flat periwinkle**	**rough periwinkle**	**whelk**	**cockle**	**mussel**	**razor**	**scallop (lower valve)**	**scallop (upper valve)**	**oyster**	**top shell**	**clam**	**small whelk**	**sea urchin**	**shipworm/ piddocks**	*TOTAL*
1	43	74	7	0	2	0	15	1	3	0	0	6	1	3	1	0	*156*
2	88	135	17	0	4	3	4	2	3	3	0	4	1	0	1	0	*265*
3	382	385	100	4	13	2	31	1	2	3	0	18	4	2	0	3	*950*
4	1430	1963	193	6	21	23	27	10	12	8	1	44	10	12	0	3	*3763*
5	172	241	77	0	15	10	31	14	11	4	1	13	5	7	0	0	*601*
6	298	1153	54	1	22	0	20	1	7	2	0	7	5	10	0	5	*1585*
7	1212	1071	140	1	17	4	7	7	1	2	0	28	3	5	0	1	*2499*
8	117	238	81	1	3	1	2	2	0	0	0	6	0	1	1	0	*453*
9	15	7	63	2	2	0	0	0	0	0	0	2	0	0	0	0	*91*
Total	*3757*	*5267*	*732*	*15*	*99*	*43*	*137*	*38*	*39*	*22*	*2*	*128*	*29*	*40*	*3*	*12*	*10,363*
% total	*36*	*51*	*7*	*<1*	*1*	*<1*	*1*	*<1*	*<1*	*<1*	*<1*	*1*	*<1*	*<1*	*<1*	*<1*	

Age deposits at Bornais Mound 1 (Sharples and Light 2012: 201–3) whereas, in contrast, common periwinkle dominated limpet in Late Iron Age deposits at Cill Donnain, less than a kilometre from Bornais (Bell and Godden 2014: 184–5). Thus the shift in preponderance to common periwinkle cannot be considered a specifically Norse manifestation.

The Norse-period marine mollusc assemblages from both Bornais Mound 3 (Sharples and Light 2012: 201–2) and Cille Pheadair reveal a significant increase in numbers and variety of lesser species, in comparison to Late Iron Age assemblages from Bornais Mound 1 (Sharples 2005d: 159–62), Cill Donnain (Bell and Godden 2014) and Dun Vulan (Parker Pearson and Sharples 1999). There are, however, some differences between the assemblages from Bornais Mound 3 and Cille Pheadair. The proportion of common periwinkle at Bornais is significantly higher than at Cille Pheadair. Conversely, the proportions of the minor species are higher at Cille Pheadair.

The proportion of mussels present at Cille Pheadair, although low, is noticeable whereas mussels are almost absent at Bornais. This probably reflects their easy availability on the foreshore rocks of the beach immediately adjacent to the Cille Pheadair farmstead (see Figure 2.1). Their absence at Bornais probably indicates how very localized shellfish collection was. The Norse-period inhabitants of both sites appear to have focused on the abundant and easily accessible.

Shellfish were most probably brought into settlements to be consumed by the inhabitants as food rather than being collected as bait or for their shells (Sharples 2005d: 159; Bell and Godden 2014: 185). The pattern at Cille Pheadair supports the picture gained at Bornais which reveals that South Uist's Norse-period inhabitants had a stronger preference for periwinkles than limpets, although the latter still remained a relatively popular contribution to the diet. A wide variety of shells of other species – generally less accessible and more time-consuming to collect – also make minor appearances in the assemblage but were not necessarily contributions to the diet. Only one shell showed signs of deliberate working (see Chapter 14.19).

20 The human remains

A. Chamberlain

Human remains are generally relatively common on pre-Norse Iron Age settlements in South Uist (Mulville *et al.* 2009) and Atlantic Scotland (Armit and Ginn 2007), but there are only two human bones from the Norse-period Cille Pheadair settlement, both from middens. The only other human remains are five children's deciduous teeth, all but one from house floors.

A fragment of a human hip bone was recovered from context 333, among the stones of an exterior cobbled surface in the northeastern midden in phase 3 when House 700, the first stone longhouse, was occupied (starting *cal AD 1030–1095* [*95% probability*]). A fragment of a human cranium was recovered from context 313, part of the windblown sand abandonment layer that covered the northern end of the site at the end of phase 5 (during which House 500 was modified and rebuilt, therefore before the start of phase 6 in *cal AD 1100–1155* [*95% probability*]).

Pelvic fragment from context 333

This is a large fragment of a left-side adult human hip bone. The fragment preserves most of the auricular surface, the acetabulum and the greater sciatic notch of the ilium, but the ischium and pubis are missing. The relatively broad sciatic notch, small acetabulum and slight pre-auricular sulcus are morphological indicators that suggest that the specimen may be from a woman. The auricular surface exhibits well-developed micro- and macro-porosity, dense and irregular surface texture, irregularity of the joint margins, moderate to marked apical changes and marked retro-auricular activity: taken together these are indicators of an advanced age at death (stage 7 in the Lovejoy *et al*. [1985] age estimation scheme) and suggest that the individual could have been greater than 60 years old when she/?he died.

Cranial fragment from context 313

This is a small fragment of adolescent or adult human cranium, originating from the region of the left asterion (junction of parietal, occipital and temporal bones). The fragment is quadrilateral in shape with a maximum dimension of about 30mm, and the cranial thickness at asterion is 3.7mm, very close to the mean value of 3.9mm obtained for a large sample of adult European crania (Weiner and Campbell 1964: 181). The fragment is well-preserved with no surface damage or erosion, and the broken edges are stained the same colour as the bone surface between the breaks. It is not possible to tell whether the breaks occurred peri-mortem or post-mortem, but the staining suggests that the fragment was broken before or at the time of deposition rather than during recent ground disturbance. There is some pneumatization (air cells) visible in the diploe at the broken edges of the temporal and parietal. This is a normal feature of bone located close to the mastoid region of the cranium. The sutures between

Table 20.1. Children's deciduous teeth from Cille Pheadair

Phase	Context no.	Envt. no.	Context type	SF no.	Deciduous tooth	Age in years	Shed
7	214		Floor	2772	Right upper 2nd molar	11–12	naturally shed
7	204	6770	Floor	2773	Upper canine	9–11	naturally shed
5	535	7028	Floor	2774	Right upper central incisor	4–5	not shed
4	222	6944	Turf wall	2775	Right lower canine	9–11	naturally shed
4	504	7197	Floor	2776	Right lower 2nd molar	11–12	naturally shed

the parietal, occipital and temporal bones are unfused but, as this is a late-fusing region of the cranial sutures, the age at death cannot be estimated from this feature.

Children's deciduous teeth

Five deciduous teeth were recovered from separate contexts (Table 20.1). All but one of them were naturally shed, the exception (SF 2774) probably deriving from a dead 4 to 5-year-old child. If this was the case, it might have been a memento dropped by a grieving parent. The spatial distribution of teeth within the house floors was varied: SF 2776 lay inside on the left of the doorway on the east side of House 500 Stage I and SF 2774 was in the centre of the east side of the same house in its later phase, while SF 2772 and SF 2773 were at the west end and along the north side of House 312. However, the distribution of three of these teeth along the long side of the house with the doorway conforms well to other artefactual evidence for the seating of children in this part of the longhouse. The teeth were all sent for radiocarbon dating but there was insufficient collagen for any determinations to be possible.

21 The carbonized plant remains and wood charcoal

H. Smith, S. Colledge and P. Austin

21.1 The carbonized plant remains

H. Smith and S. Colledge

Methods

Sampling strategy

The site was sampled extensively in order to retrieve carbonized plant remains and other macro- and micro-fossils for the investigation of plant use and associated agricultural strategies at the settlement and, potentially, to determine wild plant utilization in the wider landscape.

Processing methods

Over 1,500 soil samples were taken, and these were processed on South Uist using a flotation machine. Every excavated deposit was sampled (except for layers of clean windblown sand) and most floors were sampled in their entirety in 0.5m × 0.5m squares in order to investigate depositional patterns in a range of materials (see Chapter 1 for methodology). A total of 168 of these samples are included here, representing the main house floors and associated outhouses and hearths.

Samples comprised coarse (>1mm) and fine fractions (>300 μm) of floating material ('flots'), added to which there are the carbonized remains retrieved from the heavy residues. The majority of the carbonized plant remains were recovered in the coarse flot and these were examined in their entirety, as were the fine flots (with the exception of two cases where 50% of the fine flots was examined). Depending on the size of the complete heavy residue, and given the time-consuming nature of sorting these residues, a fraction was sub-selected for examination when considered necessary (as described in Sharples 2012b: 28–9). The raw figures were multiplied according to the fraction sorted in order to estimate numbers from the whole residue.

The coarse and fine flots were examined by different specialists (Sheila Boardman, Ellen Simmons [Simmons 1998], Rachel Ballantyne [Ballantyne 1999] and Marie Hastie [Hastie 1998]). Heavy residues were sorted by students at the universities of Sheffield and Bournemouth. Samples were examined using a low-powered stereo microscope at ×15 to ×100 magnification. Identifications were confirmed by comparison of the charred specimens with modern seed reference collections. Given the poor preservation and distortion of much of the material, the identifications of many of the wild taxa are limited to family or genus level.

All identifiable plant remains (with the exception of wood, which was examined separately; see section 21.2, below) were removed and analysed. The categories recovered include grains and seeds, cereal chaff, roots and tuber fragments (*i.e.* parenchyma from vegetative storage organs), seaweed and fragments of burnt peat.

Results

The assemblage is composed of both cultivated plants and wild species, with over 60 taxa represented across the whole site. The density of plant remains present at the site is 6.8 items per litre (based on all identifiable and unidentifiable crop remains and wild plants, although this figure rises to 7.29 if tubers, seaweed and peat fragments are included). The number of plant remains recovered from across the site was generally low. Figure 21.1 shows the density of all identifiable remains (*i.e*. cereal remains and wild plants), as compared to Figure 21.2 which shows the density of cereal remains alone. The majority of samples have very low densities of plant remains (over 80% of samples contain 0–10 items per litre). A small number of samples have high densities of plant remains (80–90 items per litre; Figure 21.1) which is due to a large number of wild plant items in a small number of samples.

Crop species

The crop species present are barley, both hulled (*Hordeum vulgare*) and naked (*Hordeum vulgare* var. *nudum*), rye (*Secale cereale*), oat (*Avena sativa*/*Avena* sp.) and a small amount of free-threshing wheat (*Triticum aestivum*/*durum*), all represented by grain, which accounts for the

Table 21.1. Total numbers and relative percentages of cereal grains, cereal chaff and flax from the longhouses and outhouses

	Phase 3	**Phase 4**	**Phase 4**	**Phase 4**	**Phase 7**	**Phase 7**	**Phase 7**	**Phase 8**	***Total Phase 3***	***Total Phase 4***	***Total Phase 7***	***Total Phase 8***	***Whole Site***
Context no.	**701**	**504**	**366**	**370**	**204**	**206**	**083**	**004**					
Context type#	**LHF**	**LHF**	**OHF**	**OHF**	**LHF**	**LHF**	**OHH**	**OHF**					
Total no. samples	54	25	8	8	31	31	2	9	*54*	*41*	*64*	*9*	***168***
Total no. litres	501	296.5	76.5	127.5	236.5	286.5	8	220.5	*501*	*501*	*531*	*220.5*	***1753***
No. of cereal grains (incl. indeterminate)	1954	2017	151	95	925	2771	165	1558	*1954*	*2263*	*3861*	*1558*	***9636***
No. cereal chaff (incl. indeterminate)	14	12	0	0	16	245	0	26	*14*	*12*	*261*	*26*	***313***
Total no. cereal items	1968	2029	151	95	941	3016	165	1584	*1968*	*2275*	*4122*	*1584*	***9949***
% cereal grain	99.3	99.4	100	100	98.3	91.9	100	98.4	*99.3*	*99.5*	*93.6*	*98.4*	***96.8%***
% cereal chaff	0.7	0.6	0	0	1.7	8.1	0	1.6	*0.7*	*0.5*	*6.3*	*1.6*	***3.2%***
No. of flax seeds (*Linum usitatissimum*)	91	36	6	1	66	120	0	1	*91*	*43*	*186*	*1*	***321***

key: LHF = longhouse floor; OHF = outhouse floor; OHH = outhouse hearth

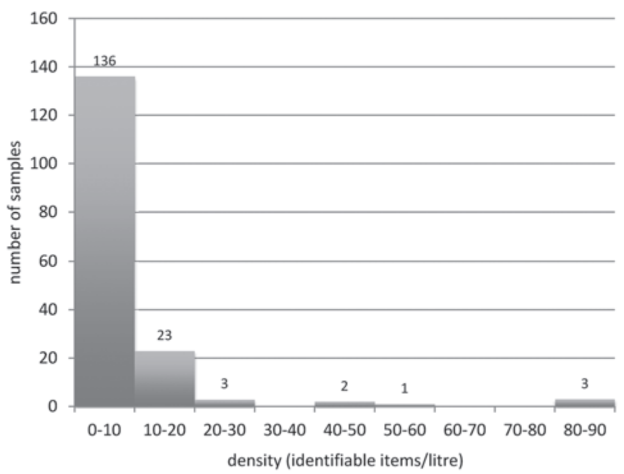

Figure 21.1. Frequency histogram showing density of all identifiable plant remains

vast majority of the crop remains. Six-row barley was identified based on the ratio of twisted (lateral) grains to straight (medial) grains, where identification was possible.

Chaff items occur in relatively low proportions (between 0%–8.1% in the different contexts represented; Table 21.1), and include floret bases and awn fragments of oats (*Avena sativa/Avena* sp.) and rachis internodes of barley (*Hordeum vulgare*) and rye (*Secale cereale*). Culm nodes and rachis internodes unidentifiable to genus are also present in the samples.

Common oat (*Avena sativa*) was identified at the site rather than bristle oat (*A. strigosa*, also known as black oat). Similarly, *A. strigosa* was not identified at Norse Bornais at either Mound 1 (Colledge and Smith 2012; Summers and Bond 2012: 230) or Mound 3 (Colledge 2000; Colledge and Smith 2005: 39). However, this smaller hardy species is tolerant of poor and calcareous soils (Dickson and Dickson 2000: 234–5; Fenton 1978a: 335) and of the harsh climate of South Uist (Campbell 1965). This, and its ubiquity in the historical period (Smith 2012), makes it very possible that bristle oat is present at both Cille Pheadair and Norse Bornais but is simply not identifiable.

Flax (*Linum usitatissimum*) is the only non-cereal crop plant present.

Wild plants

Where possible, seeds and capsule fragments of wild species were identified to species or genus although many of the wild taxa were unidentifiable due to poor preservation and damage. The wild plants found on the site include edible plants and those with economic value, such as plants used for flooring, thatching or fuel, which would imply their deliberate collection and transportation back to the settlement. Many, however, are typical weeds of cultivation, likely to have been brought back to the farmstead incidentally amongst the cereal crops.

Wild plants with economic value

Many of the wild plants found in the assemblage are likely to have had economic uses: some are edible, many could have been valued as medicinal plants or as dye plants, and others used as roofing, fuel or construction materials. The deliberate collection of these plants for their economic value is as likely as their accidental inclusion with other materials such as harvested cereal and hay crops or their arriving fortuitously on clothing and feet.

Some of the arable weeds found in the assemblage

also have edible green leaves that could have been eaten as pot-herbs or boiled as greens, for example, goosefoots (*Chenopodium album* and *C. glaucum*), orache (*Atriplex* sp.), brassicas (*Brassica rapa* and *Raphanus raphanistrum*) and sorrel (*Rumex acetosa* and *R. acetosella*). The quantity of leaves collected from these species for food would not necessarily correlate with the number of their seeds recovered because the seeds might have been included only accidentally in amongst the leaves, and an even smaller proportion of these are subsequently likely to have been charred. Furthermore, it is possible that leaves were collected at times of the year when the plants were not in seed.

Some of the taxa found in the assemblage that occur commonly in arable fields and waste ground are described in historical accounts as useful in herbal treatments and remedies. For example, chickweed was used to make healing ointments, poultices to relieve inflammation, and tea to cure insomnia. Dock root (*Rumex* spp) was pulped to make poultices to soothe stings (Beith 1995: 214) and common sorrel (*R. acetosa*), which has astringent properties, was taken for tuberculosis and to ease bruises (*ibid.*: 241).

Other valuable food sources found in the assemblage include the oil-rich seeds of flax and corn spurrey (*Spergula arvensis*), and the wild berries of blackberry (*Rubus fruticosus*), crowberry (*Empetrum nigrum*) and strawberry (*Fragaria vesca*), all of which could have grown in areas local to the settlement. The number of wild berry seeds in the assemblage is low but it must be remembered that only a fraction of seeds and plant parts with food or medicinal value is likely to be preserved within the charred assemblage because consumption of these might well have taken place away from the settlement (Colledge and Conolly 2014). In addition, oil-rich seeds such as flax and corn spurrey may not survive charring as well as other, less oily seeds.

Many plants occurring in the assemblage have been described in historical accounts as traditional dye plants; for example, yellow dye was produced from broad-leaved dock root (*R. obtusifolius*) and lady's thumb (*Polygonum persicaria*), dark orange from blackberry, purple from crowberries, and brown/blue from dock roots. The addition of dock leaves to a dye mix would have brightened or deepened the resulting colour (Anon. n.d.)

Flag or yellow iris (*Iris pseudocurus*) had many uses in the dyeing process: a green dye was made from the leaves, a yellow dye from the flowers, and a blue-grey dye and ink from the root (Beveridge 1911). Flag iris is very common in the islands nowadays, found in boggy areas, marshes and loch edges. Although only a small number of seeds are present in the assemblage, these may not fully represent the extent to which this plant was used.

Heather is well represented in the Cille Pheadair samples by both *Calluna vulgaris* and *Erica* sp. which is a possible reflection of the many uses to which it can be put and its easy availability in the local landscape. The flowers were used traditionally to make tea (Beveridge 1911); they were considered a cure for insomnia and they were used for brewing ale, as described by Thomas Pennant in 1776: 'ale is frequently made of the young tips of heath, mixing two-thirds of that plant with one of malt, sometimes adding hops'. Heather tips were also used to produce yellow and orange colours when dyeing cloth and wool (Beveridge 1911), whilst the whole plant could be used for bedding, roofing, fuel and to make brushes, besoms and rope (Beith 1995: 222; Beveridge 1911). Similarly, sedges (*Carex* spp) were also used for thatching (specifically the roots, which are particularly strong), for flooring and for making tethers for animals and fish traps (Walker 1764–1771).

Plant ashes were used for preserving food; for example, the ash of barley straw was used for salting cheese (MacGregor 1969: 89), and there are descriptions of the use of seaweed ash for the preservation of fish, meat and cheese as an alternative to salt (Martin 1703). Of additional interest is the use of seaweed or wood ash in the final stages of processing flax for cloth, with the ashes used to make an alkali bath for bleaching the fibres (Durie 1979 cited in Bond and Hunter 1987).

Evidence of the burning of seaweed at Cille Pheadair comes in two forms: charred fragments of seaweed and also burnt *Spirorbis* spp (including *Spirorbis* cf *spirorbis*). *Spirorbis* are members of the tubeworm family and live attached to seaweeds, particularly toothed wrack, kelps and thongweed (Hayward *et al.* 1996).

At Cille Pheadair, areas of the site that are rich in seaweed remains and rich in *Spirorbis* spp are not coincidental. Charred seaweed fragments occur in largest numbers in phase 3 (floor 701) and also phase 7 (floors 204 and 206), whereas charred *Spirorbis* shells occur in large numbers in phase 4 (floors 504 and 370) and phase 7 (northeastern midden). Concentrations of up to 88 shells/litre were found by the doorway and in the cooking area (floor 504) of House 500 Stage I, and up to 83 shells/litre in floor 370 of Structure 353, the north room; hearth 555 produced even greater concentrations (see Figures 6.18, 6.23). Despite the high densities of *Spirorbis* in the northeastern midden in phase 7, there are very few unburnt *Spirorbis* in the house and ancillary building floors of this phase (see distribution plots in Chapter 9). The occurrence of the highest densities of charred *Spirorbis* in and around the cooking hearth in House 500 are consistent with the use of seaweed as fuel, as attested in the historical records (MacGregor 1969).

Chickweed was used to make poultices to heal abscesses or for relieving inflammation such as mastitis (Beith 1995: 211). If the plant was chopped and simmered in lard, it also made a healing ointment (*ibid.*). Chickweed tea was believed to help with insomnia. Compared to many other species, chickweed is well represented in the assemblage, particularly in the floor of House 500 Stage I (phase 4) and floor 206 of House 312 (phase 7), where it is present in about 20% of samples (the high percentage of weed taxa in phases 4 and 7 is shown in Table 21.5, below). As a common weed of arable, it is likely to have been easily available in the local landscape.

Table 21.2. Cereal items density data by samples and context

	Phase 3	**Phase 4**	**Phase 4**	**Phase 4**	**Phase 7**	**Phase 7**	**Phase 7**	**Phase 8**	***Total Phase 3***	***Total Phase 4***	***Total Phase 7***	***Total Phase 8***	***Whole Site***
Context no	**701**	**504**	**366**	**370**	**204**	**206**	**083**	**004**					
Context type#	**LHF**	**LHF**	**OHF**	**OHF**	**LHF**	**LHF**	**OHH**	**OHF**					
Total no. litres	501	296.5	76.5	127.5	236.5	286.5	8	220.5	*501*	*501*	*531*	*220.5*	***1753***
Total no. cereal items	1968	2029	151	95	941	3016	165	1584	*1968*	*2275*	*4122*	*1584*	***9949***
Range (no. items for individual samples)	0–16	1–45	0–76	0–5	0–10	0–51	12–81	0–65	*0–16*	*0–76*	*0–81*	*0–65*	–
Mean density*	3.9	6.8	1.97	0.7	3.9	10.5	20.6	7.1	*3.9*	*4.54*	*7.76*	*7.1*	***5.68***
Median density	3	4	2	1	4	7	-	2					***3.71***

key: LHF = longhouse floor; OHF = outhouse floor; OHH = outhouse hearth. * Mean density = total cereal items whole context/ total litres

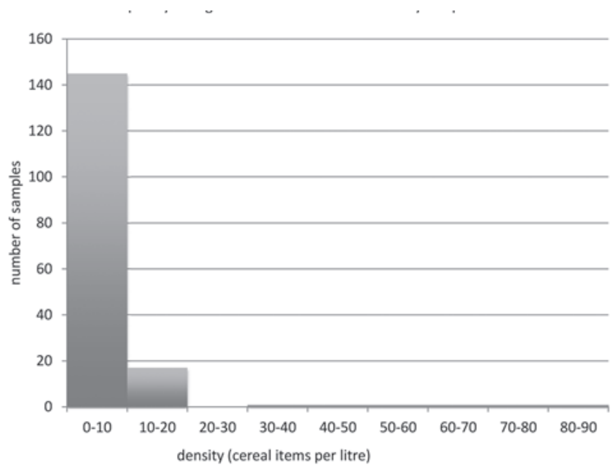

Figure 21.2. Frequency histogram showing cereal densities by number of samples

Dock/sorrel (*Rumex* spp) has medicinal use as well as food value. Its seeds are common in the assemblage, mostly in the floor of House 700 (phase 3) and floor 206 of House 312 (phase 7). Historically, dock root (*R. obtusifolius/ crispus*) was valued for its soothing properties and was pulped and used to make a poultice for stings (either of nettle or bee; Beith 1995: 214). Similarly, an ointment was made by mixing beeswax and fresh butter with boiled and pulped dock roots (*ibid.*). Common sorrel, which has astringent and slightly purgative qualities, was taken for tuberculosis and was also used to ease minor wounds and bruises (*ibid.*: 241).

The preservation by charring of the wild plant taxa alongside the remains of crop plants is likely to be the result of accidents during crop-processing or food preparation or be due to the deliberate disposal of waste and spent materials. In addition, there is the possibility of weed seeds or plant materials embedded within peat or turf used as fuel having survived the burning and adding to the mixture of charred materials.

The majority of the plant materials arriving at the settlement are unlikely to have been preserved by charring. Further taphonomic biases are introduced during carbonization and post-depositional processes. This results in a complex mix of plant materials where the final number of seeds or plant parts of any one taxon may not reflect the extent to which the plants were actually used and their economic importance is therefore potentially distorted.

Nevertheless, the composition of the plant remains within the various contexts across the site may reveal patterns in the importance of crops and plants over time, and in the use of wild plant resources available in the wider landscape. In addition, variations in the use of different buildings and in activities undertaken at the farmstead may be reflected in the composition of the plant remains. Finally, the range of wild plant taxa that arrived at the settlement as weeds of arable crops will reflect, to a greater or lesser extent, the areas of land selected for cultivation and provide some detail about agricultural strategies.

Densities of cereal remains

A mean number of 5.68 cereal items per litre of processed soil (excluding flax) was calculated for the whole site (based on a total of 9,949 cereal items and 1,753 litres of soil; Table 21.2). In comparison with other sites the density of cereal remains is not particularly high; for example, at nearby Norse-period Bornais Mound 3, a mean number of 18.0 cereal items per litre was recovered, although this site included many cereal-rich samples from a kiln and barn (Colledge and Smith 2005). The dominance of samples in the Cille Pheadair assemblage with a density of cereal items below the site mean is indicated in Figure 21.2. The positive skew shown in the distribution is due to the large number of samples with very few items.

Comparison of the mean density of cereal items by context with the overall site mean shows that, in general, the earlier contexts are below the site mean whereas the later contexts are above it (Table 21.2; Figure 21.3). If the data are examined in more detail, however, it is apparent

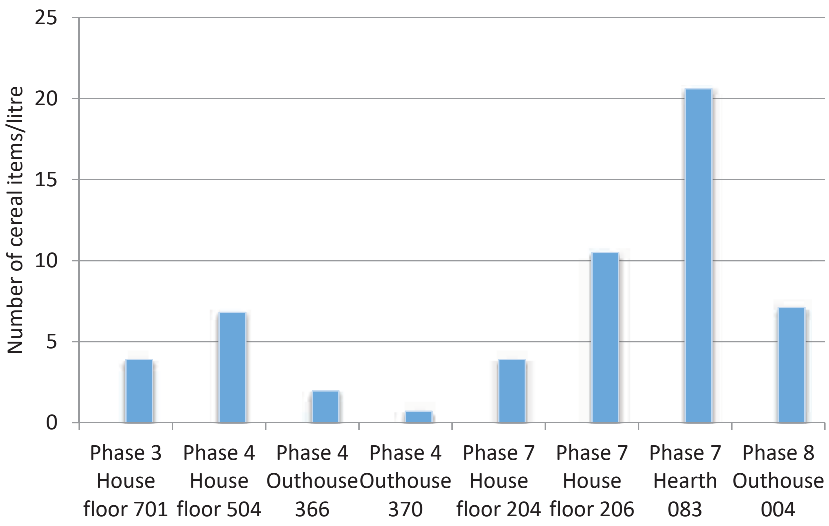

Figure 21.3. Mean density of cereal items by context and phase

that in some cases the higher average values are inflated by a small number of rich 'outlier' samples (contributing to the positive skew in the frequency histogram). For example, the four contexts that are above average with very high individual mean scores of 45 are from floor 504 (phase 4), floor 206 (phase 7), hearth 083 (phase 7) and floor 004 (phase 8), which produced maxima of 45, 51, 81 and 65 cereal items/litre respectively in the most productive sample of each context.

In phase 4, there is a contrast between the density of cereal items from the floor of House 500, at 6.8 items/litre, and the two associated floors of Structure 353 (366 and 370) which have much lower densities of cereal remains (1.97 items/litre and 0.7 items/litre respectively). These are, in fact, the lowest densities of cereal items across the site, which highlights a distinct difference in the use of this ancillary building ('OH' in the tables) and the activities taking place within. Interestingly, however, although these phase 4 ancillary building floors have the lowest mean densities overall, floor 366 has one of the highest densities of cereal remains for any one individual sample (at 76 items/litre), representing a small concentration of charred material tucked up against the wall, consistent with either an accidental dump or cleaning and sweeping away from central areas.

Similarly, there is great variation in the density of cereal remains from the different contexts in phase 7, with the primary house floor 206 in House 312 (10.5 items/litre) contrasting with the final floor 204 which accumulated during final occupation and abandonment (3.9 items/litre). Floor 206 has a greater density of cereal remains than all other house floors, based on the highest relative percentages of cereal grains, chaff and flax seeds (Table 21.1) and on some unusually rich samples, especially on the southwestern edge of the hearth. They are part of an entire deposit that is generally rich in carbonized remains compared to all other areas of the site, as illustrated by a median density that is above the site mean (Table 21.2). Hearth 083, located in Outhouse 006 (the earlier phase of which is associated with House 312), has a mean density of 20.6 cereal items/litre, which is consistent with a hearth deposit, and this context includes the richest sample on the site, with a density of 81 cereal items/litre.

Table 21.3. Percentages of crop ubiquities per phase

	ubiquity phase 3 (*n*=54)	**ubiquity phase 4 (*n*=41)**	**ubiquity phase 7 (*n*=64)**	**ubiquity phase 8 (*n*=9)**
Oats	78	76	91	100
Naked barley	0	0	6	22
Hulled barley	94	95	94	100
Rye	67	71	89	100
Free-threshing wheat	9	0	0	0
Cereal indeterminate	93	76	94	89
Flax	48	34	52	11

In Outhouse 006 in its subsequent use during phase 8, the density of cereal remains overall is high (7.1 items/litre) compared to many other contexts on the site and especially to the two earlier ancillary building floors (366 and 370 in Structure 353). It also produced one of the richest samples with 65 cereal items per litre, based on over 900 items in one sample. This particular deposit came from near the doorway of Outhouse 006, which is also consistent with sweeping and cleaning activities, during which material would have been moved towards floor edges and exits, away from the main internal areas and hearths.

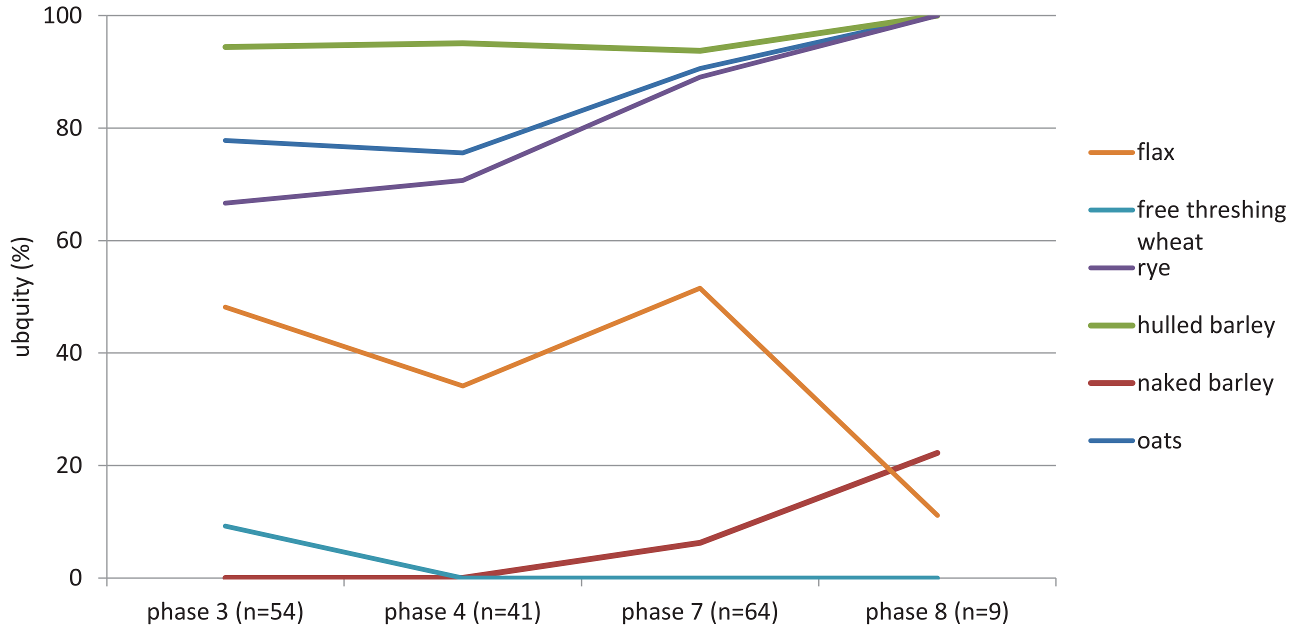

Figure 21.4. A comparison of crop ubiquities between phases

In contrast to the cereal-rich samples, primary house floor 701 (phase 3), ancillary building floor 370 (phase 4) and abandonment house floor 204 (phase 7) have uniformly low densities of cereal remains, with low means and no individual samples with aberrantly high densities of remains (Table 21.2 and Figure 21.3).

Crop species ubiquity

Ubiquity scores were calculated per phase for all crop taxa (*i.e.* the number of samples in which a taxon occurs as a percentage of the total number of samples per phase; Table 21.3 and Figure 21.4). The most common crop species at Cille Pheadair are hulled barley, oat and rye and these are present in all phases on the site, as is flax (*Linum usitatissimum*). Free-threshing wheat (*Triticum* sp.) is only present in phase 3, while naked barley (*Hordeum vulgare* var. *nudum*) is only present in phases 7 and 8.

Figure 21.4 illustrates the changes in the frequency of the crops through the life-span of the settlement. The consistent dominance of hulled barley in all phases is clear, with oats and rye the second most dominant crops. There is an obvious increase in the ubiquity of all crop species in phases 7 and 8, with the exception of free-threshing wheat and flax. Flax displays the greatest variation in ubiquity over time (Table 21.3), with the highest percentage in phase 7 (52%) and the lowest in phase 8 (11%). By phase 8, barley, oats and rye are present in 100% of all samples.

Crop species variation

The densities of grain and chaff for the different cereal species and flax were also calculated (Table 21.4). Barley grains occur in higher densities than other crops in all phases and contexts, with the exception of floor 206 (phase 7) where rye dominates.

In the earliest house floor (floor 701, phase 3), there is only slight variation in the density of the various crop species, all of which are low, although barley is dominant (1.74 grains/litre), compared to oat (0.65 grains/litre) and rye (0.3 grains/litre). Very little chaff was found in any phase 3 samples. The second highest number of flax seeds was recovered from floor 701 although the density is not particularly high (0.18 seeds/litre). In phase 4, where the majority of the cereal remains occur in House 500, the density of barley and rye are higher than in the previous phase (4.13 barley grains/litre; 1 rye grain/litre).

In phase 7, rye becomes the dominant crop in floor 206, with a density of 3.3 grains/litre. This corresponds with the huge increase in the proportion of chaff in this phase (6.3% of all cereal items; Table 21.1), most of which occurs in floor 206 (8.1% chaff for floor 206 alone). Floor 206 has high proportions of internodes of rye and oats, found mostly on the southwestern edge of the hearth. The densities of oat grains (1.55 grains/litre), barley and oat chaff (0.04 and 0.12 items/litre respectively) and flax (0.42 seeds/litre) are also higher in this floor than all other contexts. The rich samples from floor 206, together with the range of material contained, may point to crop-processing waste.

In the hearth samples (083) from Outhouse 006 in phase 7, oat occurs at a high density again (1.13 grains/litre) and barley occurs in the highest density of all crops across the site (18.88 grains/litre). In contrast, there is only a single rye grain and a complete absence of naked barley, wheat grains, all cereal chaff and flax seeds in the phase 7 outhouse (Table 21.4). This is interesting because the use of hearth 083 in Outhouse 006 is most likely to be contemporary

Table 21.4. Actual numbers and density figures (i.e. number of items per litre) of crop types and chaff by context and summarized by phase.

Phase Structure type and number[#]	3 LH 00	4 LH 500	4 OH 53	4 OH353	7 LH 312	7 LH 312	7 OH 006	8 OH 004	*Phase 3*	*Phase 4*	*Phase 7*	*Phase 8*	*Whole site*
Floor/hearth context number	**701**	**504/544/548**	**366**	**370**	**204**	**206**	**083**	**004**					
Total volume soil	501	296.5	76.5	127.5	236.5	286.5	8	220.5	*501*	*500.5*	*531*	*220.5*	***1753***
Number oat grains (incl. *A.sativa, A.*cf *sativa, A.* sp.)	327	156	38	16	130	445	9	106	*327*	*210*	*575*	*106*	***1218***
Average density oat grains	**0.65**	**0.53**	**0.5**	**0.13**	**0.55**	**1.55**	**1.13**	**0.48**	***0.65***	***0.42***	***1.08***	***0.48***	
Number hulled barley grains (incl. *Hordeum vulgare, H.* sp.)	871	1224	70	52	471	833	151	1368	*871*	*1346*	*1455*	*1368*	***5040***
Average density hulled barley grains	**1.74**	**4.13**	**0.92**	**0.41**	**2.00**	**2.91**	**18.88**	**6.20**	***1.74***	***2.69***	***2.74***	***6.20***	
Number naked barley grains (*H. vulgare* var. *nudum*)	0	0	0	0	12	0	0	3	*0*	*0*	*12*	*3*	***15***
Average density naked barley grains	**0**	**0**	**0**	**0**	**0.05**	**0**	**0**	**0.014**	***0***	***0***	***0.023***	***0.014***	
Number rye grains (incl. *Secale cereale*, cf *S.cereale*)	149	300	24	16	140	957	1	45	*149*	*340*	*1098*	*45*	***1632***
Average density rye grains	**0.3**	**1.01**	**0.31**	**0.13**	**0.59**	**3.34**	**0.13**	**0.2**	***0.3***	***0.68***	***2.07***	***0.2***	
Number free-threshing wheat grains (*Triticum* sp.)	7	0	0	0	0	0	0	0	*7*	*0*	*0*	*0*	***7***
Average density wheat grains	**0.01**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	***0.01***	***0***	***0***	***0***	
Total number cereal grains (incl. indeterminate)	**1954**	**2017**	**151**	**95**	**925**	**2771**	**165**	**1558**	***1954***	***2263***	***3861***	***1558***	***9636***
Number of items oat chaff (*i.e.* floret base, awn frag)	3	1	0	0	1	35	0	14	*3*	*1*	*36*	*14*	***54***
Average density oat chaff	**0.006**	**0.003**	**0**	**0**	**0.004**	**0.12**	**0**	**0.06**	***0.006***	***0.002***	***0.068***	***0.06***	
Number of items barley chaff (*i.e.* rachis internode)	3	8	0	0	2	12	0	3	*3*	*8*	*14*	*3*	***28***
Average density barley chaff	**0.006**	**0.03**	**0**	**0**	**0.008**	**0.042**	**0**	**0.01**	***0.006***	***0.016***	***0.026***	***0.01***	
Number of items rye chaff (*i.e.* rachis internodes)	3	2	0	0	13	162	0	1	*3*	*2*	*175*	*1*	***181***
Average density rye chaff	**0.006**	**0.007**	**0**	**0**	**0.055**	**0.566**	**0**	**0.006**	***0.006***	***0.004***	***0.33***	***0.006***	
Total number chaff items (incl. indet)	**14**	**12**	**0**	**0**	**16**	**245**	**0**	**26**	***14***	***12***	***261***	***26***	***313***
Number flax seeds (*Linum usitatissimum*)	91	36	6	1	66	120	0	1	*91*	*43*	*186*	*1*	***321***
Average density flax	**0.18**	**0.12**	**0.8**	**0**	**0.28**	**0.42**	**0**	**0.005**	***0.18***	***0.86***	***0.35***	***0.005***	

key: LH = longhouse; OH = outhouse

Table 21.5. Total numbers and relative percentages of crop items and wild plant items by phase.

Phase and structure type#	**Total Phase 3 LH**	*Phase 4: LH*	*Phase 4: OH*	*Phase 4: OH*	**Total Phase 4 LH & OH**	*Phase 7: LH*	*Phase 7: LH*	*Phase 7: OH*	**Total Phase 7 LH & OH**	**Total Phase 8 OH**
Total no. crop items (*i.e.* cereal grains, cereal chaff and flax seeds)	**2059**	*2065*	*157*	*96*	**2318**	*1007*	*3136*	*165*	**4308**	**1585**
Total no. wild plant items (excluding seaweed, tubers, dung, peat)	**238**				**390**				**1059**	**59**
% crops	**89.6**				**86**				**80.3**	**96**
% wild	**10.4**				**14**				**19.7**	**3.6**

key: LH = longhouse; OH = outhouse

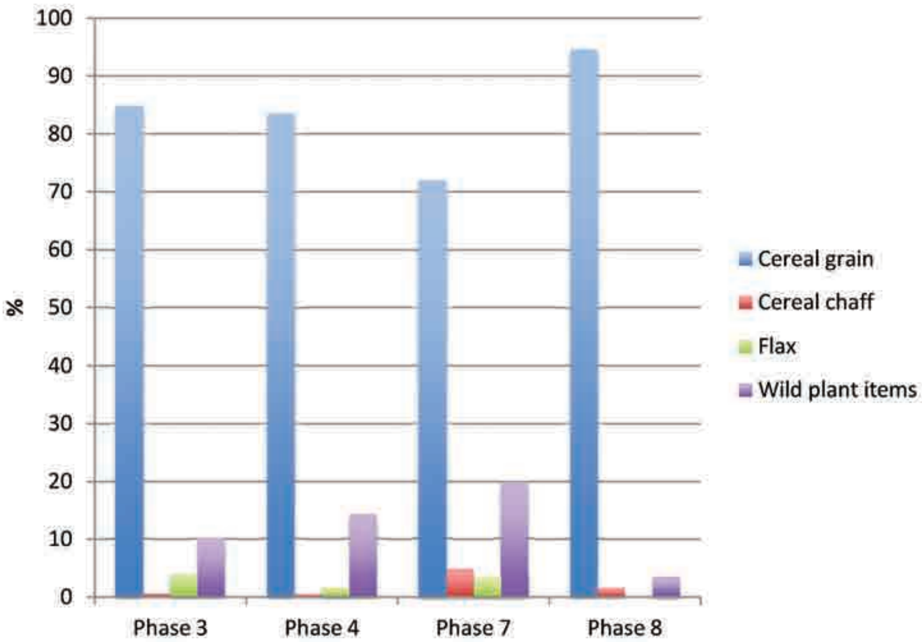

Figure 21.5. Relative percentages of cereal grain, chaff, flax and wild plant taxa by phase

with the occupation of House 312, in which cereal-rich floor 206 is located. This would suggest that the activities associated with crop and food preparation were not the same within the two buildings, with crop-processing waste suggested by the plant remains from floor 206 in contrast to a virtually clean crop in hearth 083.

In phase 8, in floor 004 (Outhouse 006), the density of barley is just above the site average (6.2 grains/litre) with oats and rye in lower densities than are seen in most other phases (Table 21.4).

In summary, based on both density and ubiquity data, a number of points are clear and both spatial and temporal trends emerge. The site has low densities of crop remains in general, with the lowest densities occurring in the earliest phases. During the occupation of the settlement, the densities of crop remains increase. Of the crops, barley dominates the plant remains found on site, occurring in higher densities than all other crops in all floors and all phases with the exception of floor 206 (phase 7).

It is in phase 7, and particularly within house floor 206, that there are noticeably higher densities of crop remains compared to other floors, with greater ubiquities of the three main cereal types (barley, oats and rye) and a change in the dominant cereal species. Rye occurs with greater frequency than barley and this coincides with the very high number of rye chaff items also recovered from this context.

The only occurrence of wheat (free-threshing) is in the earliest house on the settlement (phase 3) and in such low density that it may represent a contaminant. Naked barley also occurs in very low densities in phases 7 and 8. Flax is more dominant in floor 206 than elsewhere, although the higher densities are from house floors in all phases, in contrast to the outhouse floors. There is no flax present in the final phase of activity of Cille Pheadair (phase 9).

Weeds

The number of wild species recovered was generally low, and the density and percentage presence figures have been calculated in order to investigate potential patterns across the site. The relative percentage of wild plants compared to crop plants through time is shown in Table 21.5 and Figure 21.5. There is a steady rise in the number of wild plant remains in each phase, from about 10% (238 items) in phase 3 to nearly 20% (1,059 items) in phase 7, until phase 8 (the final period of occupation of a longhouse) where the figure drops dramatically to just 3.6% (59 items). This pattern is also reflected in the ubiquity scores, with a higher percentage presence of most taxa in phase 7.

Description of the weed groups

As so few wild plant taxa could be identified to species level, the amount of information that can be inferred about land types based on the environmental and ecological preferences of individual species is limited. Despite the low numbers of taxa, it is, however, possible to identify trends in the data that may relate to changes in land use, agricultural activities or wild plant use over time.

The weed taxa can be grouped according to the environments in which they most commonly occur, which may reflect preferences for certain ecological conditions or land types.

A number of weed species represented in the assemblage are commonly found on arable land and gardens, where soils are well-manured and frequently disturbed. These include fat hen (*Chenopodium album*), chickweed (*Stellaria media*), orache (*Atriplex* sp.), wild radish (*Raphanus raphanistrum*), corn spurrey (*Spergula arvensis*), knotgrasses (*Polygonum* spp) and docks (*Rumex* spp). Some of the same species may also occur on waste ground and pasture. In all cases, the highest numbers of these seeds occur in floor 206 (phase 7) and floor 504 (phase 4).

Other indicators of fields, field edges, waste ground and pasture, but occurring in low numbers, include wild turnip (*Brassica rapa*), ribwort (*Plantago lanceolata*), cleavers (*Galium aparine*), broad-leaved goosefoot (*Chenopodium glaucum*), common sorrel (*Rumex acetosa*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), heath grass (*Danthonia decumbens*), common/heath milkwort (*Polygala vulgaris/serpyllifolia*), cinquefoil (*Potentilla* sp.), nipplewort (*Lapsana communis*), common fumitory (*Fumaria officinalis*), sun spurge (*Euphorbia heliscopia*), petty spurge (*Euphorbia peplus*), campion/catchfly (*Silene* sp.) and autumn hawkbit (*Leontodon autumnalis*).

Specific characteristics of soil type in the cultivation areas can be inferred from the presence of some of these weeds. For example, on South Uist in the present day, much of the arable land is located on the sandy calcareous machair plain on the west coast, where wild turnip is common in cultivated fields (Bennett 1991). Similarly, petty spurge prefers rich calciferous soils and creeping buttercup favours damp fields, machair and dune slacks (Stace 1991). In contrast, common arable weeds such as wild radish, sheep's sorrel and corn spurrey are more likely on acidic soils (Bennett 1991; Bond *et al.* 2007; Stace 1991; Plants for a Future n.d.; NatureGate n.d.). Such soils can be found on the eastern edge of the machair, where it is low-lying, and where the blown sand merges with peat to produce peaty-loam soils, called 'blackland'. Cultivation plots are also found on these areas where soils are more acidic in nature.

Of particular interest is the presence of corn spurrey, a common annual weed of crops, especially spring barley and flax (Bond *et al.* 2007). Although corn spurrey has mostly been linked to light sandy soils (Hallgren 1996), it can also grow well in heavy peaty soils, but most significantly it has a particular preference for lime-deficient soils with a low pH (4.6–6; Bond *et al.* 2007), which is of interest in a landscape such as South Uist where there is great variability in soil pH.

In the weed assemblage, indicators of wet, damp or boggy ground include sedges (*Carex* and Cyperaceae spp), yellow iris (*Iris pseudocurus*), blinks (*Montia fontana*), lesser spearwort (*R. flammula*), meadow buttercup and creeping buttercup, of which sedges represent the largest number of seeds by far. All of the taxa can be found on damp grassland, in marshes and at stream-side locations (Stace 1991; Rose 1981). Such habitats are common on the island, where much of the land is waterlogged either permanently or seasonally. More specifically, species indicative of wet ground, for example creeping buttercup and iris, could point to damp arable fields or pockets of arable prone to flooding.

Heathland, which covers a large extent of the island from the central area to the east coast, is well represented in the assemblage, mostly by common heather (*Calluna vulgaris*), species of heaths (*Erica* spp) and crowberry (*Empetrum nigrum*) (Pankhurst and Mullin 1991). Interestingly, heather shoots represent the overwhelming majority of the remains, with all 328 identified shoots coming from floor 206 (phase 7) and a further concentration of the flower-heads of heaths concentrated in floor 504 (phase 4).

In short, the various soil types and land conditions within the present-day landscape around the site are represented by many of the species in the Cille Pheadair assemblage. From the relative proportions of seeds, it is not obvious that any one particular type of ground is better represented. Overall, there are higher numbers of weeds typically associated with arable land (such as orache, fat hen, wild radish, knotweed and chickweed) than those species that could grow more generally on waste ground, pasture, roadsides or disturbed ground, but these are all outnumbered by seeds of sedge and grasses and shoots of heather. Some of the weeds of arable are annuals that produce very large numbers of seeds (for example, chickweed) and so the dominance of these may not be comparable to lower numbers of other taxa. Equally, the very high densities of heather shoots are from a small number of samples, representing a discrete dump of material probably from a single activity.

The percentage presence of all wild plants (some grouped by genus or family) from all samples was calculated in

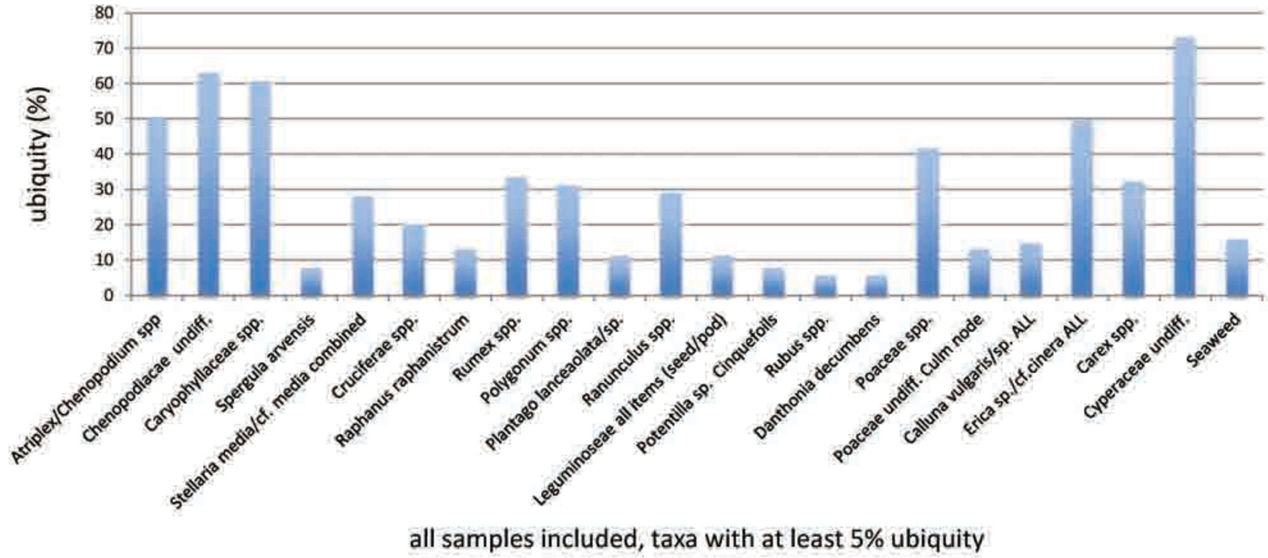

Figure 21.6. Percentage presence of all taxa where present in more than 5% of samples

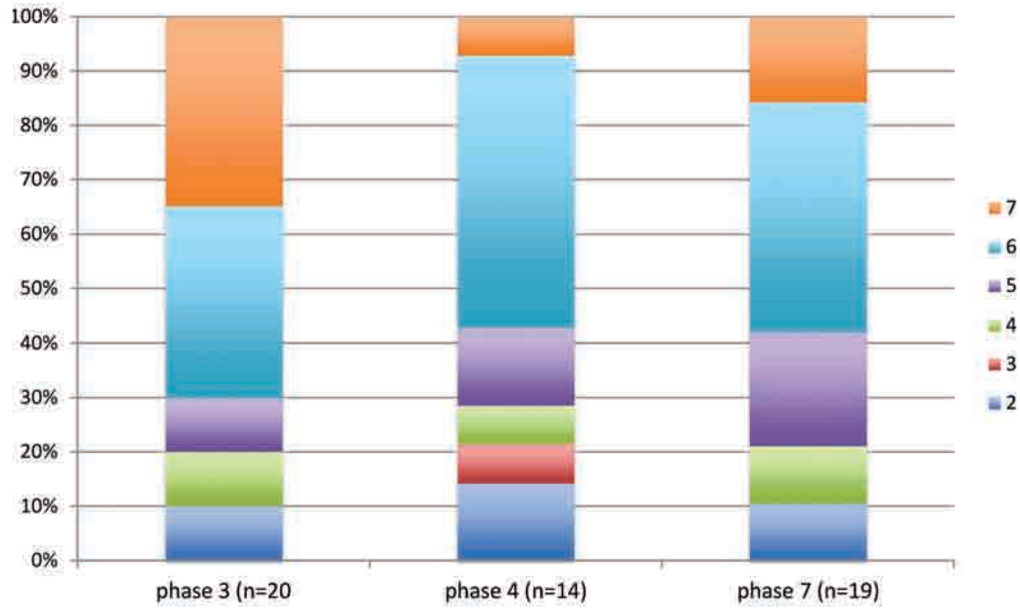

Figure 21.7. Percentage chart showing changes in pH indicated by species present by phase

order to compare the ubiquity of taxa across the site. Those present in more than 5% of samples are shown in Figure 21.6. It is clear that two groups dominate, common weeds of arable (Chenopodiaceae and Caryophyllaceae), with taxa from heath and moorland (*Calluna vulgaris, Erica* sp. and Cyperaceae) and Poaceae spp. However, the histogram does not tease the taxa apart by phase. Examination of any changes in the proportion of different plant taxa over time may reveal aspects of land use during occupation of the settlement.

Ecological analysis

It can be argued that, in a landscape such as South Uist, the wide variety of ecological zones in a relatively narrow geographical area provides the inhabitants with easy access to the full variety of plant types and may therefore increase the likely occurrence, and hence mixing, of wild, edible and useful plants, alongside weeds of arable, in an archaeological assemblage. Added to this is the difficulty of discerning patterns in a seed assemblage that may be due to changes in the location or types of land used for arable over the period of settlement. With this in mind, if groups of weeds from particular ecological zones can be teased apart on the basis of specific characteristics and tolerances of individual species, then it may be possible to identify changes in land use over time as represented by the Cille Pheadair seed assemblage.

Seeds of wild species in the assemblage that were identified to species (where the degree of preservation

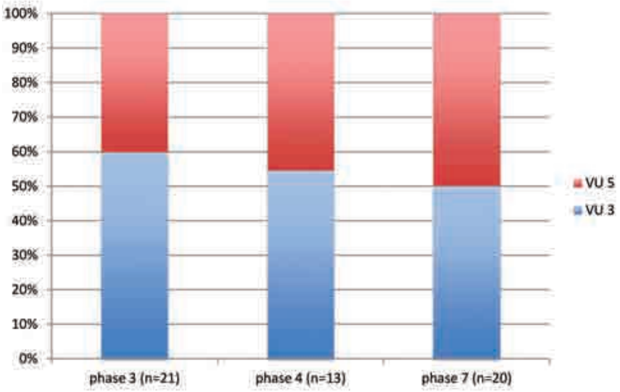

Figure 21.8. Percentage of vegetation units 3 and 5 for phases 3, 4 and 7

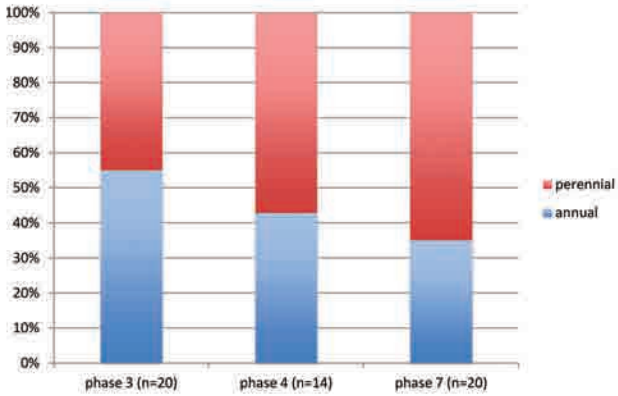

Figure 21.9. Percentage of annuals and perennials for phases 3, 4 and 7

was suitable) were used for further analysis, according to Ellenberg's indices (Ellenberg 1988: 665–710; see also Hill *et al*. 1999). The indices are derived from a hierarchical classification system that consists of eight main vegetation groups (essentially communities), including vegetation of wetlands, frequently disturbed places, heaths and grasslands, and woodlands. The indicator values are based on environmental variables drawn from individual species data originating in central Europe, but they have been applied successfully to ancient and modern data-sets in a wider European setting (*e.g.* Schaffers and Sykora 2000; Karg 2008; McClatchie *et al.* 2014; Schepers 2014; Colledge and Conolly 2014). A nine-point scale for each of seven variables that relate to soils (acidity, water content, nitrogen and salt) and to climate (light, temperature and continentality) was applied to the data-set according to Ellenberg's classification.

The Cille Pheadair data-set was interrogated using the environmental indicators of the growing environment and soil type. Results show a slight increase over time in soil acidity, as indicated by plant preferences (Figure 21.7). The predominant pH indicator value in all phases is 6, where, on the scale of the reaction indicator values, the mid-point value of 5 relates to species that are 'indicators of fairly acid soils, only occasionally found in more acid or in neutral to slightly alkaline situations' (Ellenberg 1988: 676). However, indicator values with low numbers (*i.e.* more acid) show an increase over time; values of 5 or less increase from 30% in phase 3 to over 40% in phases 4 and 7. This change suggests either that the existing arable land became more acid, or that some fields were re-located to ground with more acid soils, or that a greater range of plant materials was collected from areas with acid soils such as heathland.

Soil nitrogen indicator values show a very slight increase (5%) in plants tolerant of nutrient-poor soils over time, from 45% with values of 5 and above in phase 3 to 50% in phases 4 and 7 (where a scale of 1 to 9 relates to nutrient-poor and nutrient-rich respectively). This may reflect slight exhaustion of the arable soil over time or a change to less fertile land. Soil moisture indicator values, however, show little change over time which suggests that, whatever changes might have occurred in land type being exploited, these did not include the use of wetter ground.

The most commonly occurring vegetation units, unsurprisingly, were units 3 and 5, namely weeds of arable (3) and weeds of grass, heath and open areas (5). The relative proportion of species in unit 5 clearly increases over time, from 40% to 50% (Figure 21.8). This pattern could reflect an expansion of arable farming onto marginal land. Corresponding with these results is the strong trend shown in the relative proportion of annuals and perennials over time (Figure 21.9). In phase 3, annual species comprise around 55% of the weed species and perennials 45%, yet by phase 7 the percentage of perennials increases to 65%. The increase in perennials is also consistent with an expansion of cultivation onto new land, and possibly onto marginal, nutrient-poor land.

The presence of perennials in weed floras associated with the cultivation of new land and extensive cultivation has been illustrated in modern survey data of weed floras in the Hambach Forest experiment (Bogaard 2002). In this study, new cultivation plots were created in recently cleared woodland (*i.e.* shifting cultivation), with little or no weeding (*i.e.* extensive cultivation). The new plots of arable were characterized by high proportions of perennial weeds (compared to annuals) and could be distinguished from long-lived permanent plots that were characterized by weed floras with a high proportion of annuals (*ibid*.). Perennials may also reflect nutrient-poor soils, typical of marginal land, as they tend to develop deep root systems that can access water and soil nutrients and enable the plants to compete successfully against shallow-rooted annuals (Brickell 1992; Fitter *et al*. 1974).

Perennials typically grow structures that allow them to live from one year to the next through tubers and rhizomes rather than by seeding. Therefore, an increase in perennials may reflect a change in tilling methods, where less disturbance to the soil allows perennial weeds to dominate (Van der Veen 1992; Jones 1985) and, in the same way, it could reflect fallowing of fields. The style of shallow ploughing adopted for the rocky conditions and shallow soils of the Western Isles (Fenton 1976; Smith

1994) would have left such vegetative structures in place. This was particularly so in case of the ristle plough (*crann-ruslaidh*), supposedly of Norse origin (Fenton 1976). This simple plough produced a narrow channel through the soil, particularly effective on the vegetation and root mat of fallowed or waste land, and it prepared the way for the larger *crann-nan-gad* plough (*ibid.*). Although the shallow cultivation bed left much of the root material and tubers of perennial plants in place and contributed to the large numbers of weeds growing amongst cereal crops, it also helped to prevent sand drift better than deeper ploughing would (Grant 1979; Fenton 1976).

When considered against the context of the site, the increase in perennials and weeds of grass, heath and open areas over time is consistent with expansion of cultivation onto new, formerly undisturbed ground, whilst the information based on pH tolerances of weeds arriving at the settlement may suggest either that more acidic land was selected for the location of new cultivation plots or that a more diverse range of plant materials for use at the farmstead was collected from areas of more acidic land.

All of these changes are first evident in phase 4, and coincide with an increase in the densities of barley and rye in the assemblage. In phase 7, the increase in perennials and weeds of grass, heath and open areas continues, alongside a particularly noticeable increase in the frequency of rye.

Such changes seen together beg the question of whether it is possible to establish where the newly cultivated land might have been located. A more detailed consideration of the types of land used for cultivation within close proximity of the settlement and the differences in their arable potential may help determine the most likely areas utilized for the intensification seen in cereal production.

Locally accessible land types

The settlement at Cille Pheadair is located on the machair plain of the west coast, composed of calcareous shell-rich, blown sand where pH levels are generally high (6.5–7.5 in topsoils and 7.5–8.0 in subsoils) and organic content is very low (usually lower than 10%; Dickinson 1977; Hudson 1991). The machair system comprises different zones depending on topography, drainage and ground-water levels and is further characterized by the soils and vegetation that develop (Dargie 1993; Dickinson and Randall 1979; Perring and Randall 1972).

Immediately to the east of the coastal dune system, there is a gently undulating free-draining plain where the water table is usually below the soil profile. Because of their low organic content and permeability, the sandy soils are dry and may be leached of nutrients, particularly phosphates, nitrates, potassium, copper and manganese (Owen *et al.* 1996). On this 'dry' machair (Boyd and Boyd 1990), brown calcareous soil and calcareous regosols develop (Hudson 1991), although these are poorly evolved and erode easily when the turf is broken (Boyd and Boyd 1990). Despite many of the obstacles to cultivation, these are still productive soils, as long as fertility and organic content are maintained, aided by rotational cropping with fallow periods (Boyd and Boyd 1990; Smith 1994).

To the east of this strip the land slopes downwards, often towards machair lochs. The water table is closer to the surface and, because the soil is no longer free-draining, the ground becomes marshy and is prone to seasonal flooding. This results in the formation of calcareous ground-water gleys, and peaty gleys in the lowest areas where the machair borders lochs and the adjoining land (Hudson 1991; Glentworth 1979). This is defined as the 'wet machair' by Boyd and Boyd (1990).

Although there is great variability, distinctive vegetation communities are present. Among the plants found in the Cille Pheadair assemblage, ribwort plantain, meadow buttercup and milkwort, for example, occur on the dry machair; spearwort, common sorrel, violet/pansies and autumnal hawkbit occur on the wet machair (Boyd and Boyd 1990).

Inland of the machair is an extensive area where soils have formed over glacial till deposits and acid bedrock. It is here, where the calcareous blown shell sand blends with the acidic peat to form sandy loam, that some of the best cultivation land is found; this is the croftland, known as 'inbye' or, locally, as 'blackland' because of the contrast in appearance with the light sandy machair (Boyd and Boyd 1990; Hudson 1991; Owen *et al*. 1996: 129; Robertson 1982). Where drainage is good on areas of coarse textured drift, brown forest soils or cultivated humus-iron podzols may occur but, where drainage and permeability are poor, soils include non-calcareous, humic and peaty gleys (Hudson 1991). The flora distinctive of the blackland that also occurs in the Cille Pheadair assemblage includes hawkbit, grasses, iris, sedges and buttercup.

On areas of land immediately to the east of cultivated blackland, where the peat has often been cut for fuel leaving 'skinned land', peaty gleys and podzols occur (Hudson 1991). Further east, acidic peaty soils and blanket peat are widespread as a result of the acidity of the parent material, the anaerobic waterlogged conditions that result from poor natural drainage, and the cool wet climate of the region (Hudson 1991; Boyd and Boyd 1990; Angus 1991). The peat varies locally in nature but is always very acidic (Hudson 1991; Weaver *et al.* 1996) and thus influences the vegetation it supports.

Machair and blackland as cultivation land

These different environments and soils are common on South Uist and the main areas of arable, the machair and blackland, are close to the Norse-period settlement at Cille Pheadair. The machair was obviously the most accessible land during this period because this is where the farmstead was located. It is likely that the current topography and position of the high, dry machair in relation to lower-lying, wet machair, the inland freshwater machair lochs and any remnants of a dune system, have changed since the time of occupation, considering coastal erosion and the complexity of machair evolution and sand movement (see Chapter 1;

Ritchie 1979; Gilbertson *et al.* 1996; Owen *et al.* 1996). The nature of the soils will also have changed in accordance with fluctuations in the water table (Hudson 1991).

Historically, the cropping regime for machair and blackland has varied up and down the islands, according to the availability of the different land types, their suitability for the different crop species grown, the ease with which the ground can be prepared, and the intensity of cultivation that they can withstand (Fenton 1976; Smith 1994; 2012).

Problems of machair cultivation

From historical records, we know that the machair was generally considered well suited to the production of barley, oats and particularly rye. It was favoured for cultivation because it could be easily ploughed compared to the blackland, where the depth of soil varies and where rocky patches have forced spade cultivation.

The sandy permeable nature of machair made it unsuitable for continual cropping, however, because it is easily leached of nutrients, and the low organic content added to problems of instability caused by friability in high winds once the ground was broken. This was particularly the case for the higher, dry machair (Grant 1979; Walker 1764–1771), whereas the higher water table and organic content of the lower-lying machair helped to combat leaching and loss of moisture, although it was prone to seasonal flooding (see Sharples 2012b: figs 139–140). Some early records specify exactly which areas of machair were being utilized; for example, in the estate plans drawn up by Reid for North Uist (1799) the inner, lower areas of machair are indicated as the main arable ground, along with drift-covered blackland.

As a result of these limitations, the most common regime for machair included three years of cereal crops, followed by two or three years of fallow before turning to grass (Walker 1764–1771: 77). Effectively, machair was treated as an outfield. In contrast, blackland could withstand continual cropping (as an infield; see Smith 2012 for organization of infield/outfield cultivation), although yields could be compromised as a result. In all cases the ground was fertilized in the first year for the main crop. For fertilizer, seaweed was used mostly on machair (which added much needed potassium, along with other nutrients) and animal muck on the blackland (Smith 2012).

The Cille Pheadair crops in a wider context

Barley, oats, rye and flax are the main crops found at Cille Pheadair and the nearby Norse site of Bornais. A few grains of wheat were recovered from the earliest phase at Cille Pheadair, although none were found at Bornais Mound 3 or in Norse-period deposits at Mound 1 (although it was present in very small numbers in the Late Iron Age deposits at Mound 1; Colledge and Smith 2005; 2012). Other Norse sites in the Western Isles where plant remains have been recovered include the Udal, North Uist (results unavailable) and Barabhas (Barvas) machair, Lewis (Dickson 1981).

Barley is the most ubiquitous of all the crops in the Cille Pheadair assemblage and, similarly, is the most commonly occurring at Norse Bornais and at Barabhas machair. This continues the pattern seen at the Iron Age sites of Dun Vulan (Smith 1999), Baile Sear (Baleshare) and Hornish Point (Jones 2003) on South Uist, and Cnip (Church and Cressey 2006) and Dun Bharabhat (Church 2000) on Lewis, where hulled six-row barley is the dominant crop (although at Baile Sear, Hornish Point and Dun Bharabhat two-row barley is also found). Barley is well suited to cultivation in the islands because it can tolerate the wet, cool climate and the increased salinity of coastal locations (Dickson and Dickson 2000).

Oat and rye are the second most common crops at Cille Pheadair and Bornais although, overall, rye occurs in greater numbers than oat at Cille Pheadair, whereas oats are more common than rye at Bornais Mound 3. Several hundred oat grains were recovered from Barabhas machair, although rye is not present in the samples. Oat and just three rye grains were recovered from the Norse deposits at Bornais Mound 1, and there is a small amount of oat (*Avena* sp.) and one possible rye grain from Iron Age Dun Vulan (Smith 1999).

Both oat and rye are well suited to cultivation in the Hebrides as they can withstand poor climatic conditions and can tolerate poor soils. Common oat was identified in the Cille Pheadair assemblage but, despite the presence of some oat floret bases, it was not possible to identify bristle (or black) oat (*Avena strigosa*), recorded on Scottish sites in the Norse period (see Fenton 1978a; Holden 1998; Bond 2007) and recorded as growing on South Uist in historical records (*e.g.* Blackadder 1800; Walker 1764–1771).

Common oat is considered better suited to cultivation on the heavier, loamy ground of the blackland and peatland rather than on the machair (Smith 2012) whereas the bristle oat can grow well on all the land types, especially the poorer soils. The light-weight nature of the smaller seed head enabled it to be better adapted to strong wind and heavy rain, compared to the heavier common oats (Campbell 1965). As noted in 'Crop species' above, it is very possible that bristle oat is present in the Cille Pheadair assemblage but is simply not identifiable.

Rye is drought-tolerant and thrives on poor, dry marginal soils and in areas where the climate is unfavourable, which gives it a competitive advantage over other more demanding cereals (Behre 1992; Lockhart and Wiseman 1980). It grows well on light sandy soils, such as the acid, sandy regions of north and north–central Europe, where the cultivation of rye expanded rapidly in the medieval period (Behre 1992; Küster 2000) and it can also thrive on peat or on raised bog (Behre 1992). It is the ability of rye to thrive on dry, marginal land that made it well suited to the machair.

In historical accounts, rye is listed along with barley and oats (and sometimes flax and hemp) as growing successfully on Lewis, North Uist and South Uist, in the latter case specifically on sandy soil (Martin 1703; Walker 1764–1771). The dry areas of the machair to which it would have been most suited are, of course, the

most vulnerable areas with regard to disturbance from cultivation. Interestingly, Walker noted that farmers on Harris stopped growing rye prior to 1772 owing to the damage it caused to the land (Walker 1764–1771).

In the recent past, rye has been grown as part of a 'maslin' crop with barley and oats in order to spread the risk of uncertain summer weather. Rye will still produce decent returns in years in which barley and oats may grow less productively (Smith 1994). Historically, rye was particularly valued over oats in the years when the yields of both oats and rye as outfield crops were recorded as being as low as fourfold (Walker 1764–1771).

In the Norse period for South Uist, flax is recorded at both Cille Pheadair and at Bornais. Flax, the only non-cereal crop plant, occurred in much greater numbers at Bornais Mound 3 (a total of 3,284 seeds; Colledge and Smith 2005: tabs 12–14) than at Cille Pheadair (321 seeds). On Lewis, flax was found in small quantities at Barabhas machair (only 33 seeds from seven contexts). It is present in low numbers in the Norse and Late Iron Age levels of Bornais Mound 1 (Colledge and Smith 2005: tab. 64) but not at nearby Middle Iron Age Dun Vulan (Smith 1999) or at Iron Age sites in Lewis (Church 2000; Church and Cressey 2006).

This is a similar pattern to that seen in the Northern Isles, where flax is merely present at Late Iron Age sites such as the Howe (Dickson 1994), Scalloway (Holden and Boardman 1998), and Old Scatness (Bond *et al.* 2010), but occurs as a main crop on a regular basis at the Norse sites of Pool (Bond 2007) and Saever Howe (Dickson 1983). Thus, although not a completely new introduction to South Uist, the cultivation of flax certainly intensified in the Norse period, as it did across the wider region at this time (Summers and Bond 2012).

Flax has a preference for well-drained soils, and it is not tolerant of frost or heavy rain, or competition from weeds (Dickson and Dickson 2000). Although it prefers fertile soils (*ibid.*), historically it was grown on the less fertile outfield land, often in the second or third year of rotation after manuring, rather than taking the best infield land reserved for the barley crop (Turner 1972). Flax was well suited to cultivation in the Western Isles where the machair provided free-draining soil, and fertility could be maintained with the addition of manure or seaweed (MacLean 1845).

It is most likely that the crops at Cille Pheadair were spring-sown, given that most of the arable weeds are either summer annuals or perennials. Rye is usually grown as a winter crop, especially on less favourable soils and under less favourable climatic conditions (Küster 2000) but it is also possible to grow summer rye (*ibid.*).

The short growing season of all these crops fitted with the growing season of the area, which currently spans early April to early December, based on a soil temperature above 6°C (Boyd and Boyd 1990: 46–51). The climate is generally mild but there are often high winds and low day-time temperatures as well as occasional summer droughts to contend with (*ibid.*).

The growth of vegetation is generally slow, owing more to the slow rise in the temperature and slow drying-out of the soil, than to the average temperature itself. Even on well-drained loams, it is not possible to plough until early April (Boyd and Boyd 1990: 46–51). This factor would have added to the attractiveness of the machair for cultivation and would have made it possible to get some of the crops in earlier than other, less well-drained soils would have allowed. Choosing spring cereal over winter types would have allowed farmers to reduce the production risks associated with winter sowing at higher latitudes.

Spring-sowing of crops also fitted with the open-field system noted in historical records, and the use of the arable land for the animals over as many of the winter months as the land could stand. As a result, it gave the more fragile areas of ground a chance to stabilize. In the traditional system recorded by Walker and Martin in the eighteenth century, crops were sown late even for spring-sowing: rye and oats not until the beginning of April, and barley in the latter half of May (Martin 1703; Walker 1764–1771). The harvest began on or about 15th August (*ibid.*). Flax is also a spring-sown crop, harvested in August (Bond and Hunter 1987).

As discussed above, the seasonal flooding of the low-lying stretches of machair plain on South Uist, described by Martin (1703), would have militated against any winter sowing of crops as encouraged by the 'improvers' who visited the islands (Fenton 1976).

The machair and the blackland: agricultural expansion

The increasing number and ubiquity of oat and rye remains at Cille Pheadair over time represent the rapid assimilation of these 'new' cereals into existing farming systems by the Norse-period farmers. Flax was also introduced while barley continued to dominate, being present in all samples by the final phases of the settlement.

All of this would suggest agricultural expansion and intensification. The incorporation of new areas of arable ground to underpin this expansion may be reflected in the increase in perennial weeds during the occupation of the settlement. If expansion was directed onto areas of marginal machair where rye could thrive, we can anticipate the appearance of weeds tolerant of calcareous soils, possibly including perennial weeds.

Included in the range of wild plants recovered at Cille Pheadair are species that are common weeds of arable, which prefer rich, well-manured and cultivated soils. Included in this group are goosefoots/oraches and chickweed which are some of the most frequently occurring arable weeds in the assemblage. These are annuals that might all have grown amongst the main barley crop in manured fields on the more fertile areas of machair or elsewhere. Plants in these groups increase steadily in seed numbers up to phase 7, consistent with the increase seen in all the crops.

Plants with tolerances for the sandy or calcareous soils that occur in cultivated machair fields include wild turnip

and spurge (although not in large numbers). Perennials such as ribwort plantain, broad-leaved and curled dock, and meadow buttercup are found on arable ground and pasture located on the machair (Love 2009; Bennett 1991). Dock was found to have an association with flax in the study by Bond and Hunter (1987) and could be associated with the same weed flora as a barley crop, indicating enhanced soils. The ubiquity of the dock species increases in phase 7, along with ribwort plantain, which may be indicative of greater machair cultivation and would correlate with the increase in frequency of the other common weeds of arable.

Wild radish is also associated with nutrient-rich, well-cultivated soil, preferring sandy or loamy soils and also known to mostly prefer non-calcareous soils (Hanf 1983; Plants for a Future n.d.; Garden Organic n.d.). Likewise, corn spurrey, a common summer annual of arable fields and gardens, prefers light sandy soils, although it too is associated with non-calcareous soils and will also grow on peat (Bond *et al.* 2007).

The most obvious area of arable land with low pH near to Cille Pheadair is the blackland, although sandy loam soils with lower pH than the main area of machair occur where the shell-rich sand has blown inland and merged with the peaty soils of the blackland. This is on the inland edge of the machair plain and, as long as the water table is not too high (in the spring and summer months when crops are in the ground), it would meet the preferences and tolerances of these species. Other weeds associated with cultivation that also have a preference for non-calcareous soils include sheep's sorrel and heath grass.

The weeds at Cille Pheadair show an apparent change over time in the type of land used for cultivation. Either different pockets of machair were selected for their specific characteristics (including some areas likely to be more organic-rich and with lower pH) or cultivation on the machair was complemented by cultivation of blackland soils, as indicated by those arable weeds that prefer more acid soils.

Rye would have suited the drier areas of machair on which other crops would have had difficulty. Barley would have prospered on well-manured areas of land, such as more fertile organic machair. Both corn spurrey and wild radish are most frequent in phase 7 at Cille Pheadair, although wild radish is also present in phase 3. It is in phase 7 that the ubiquity of oats, rye and flax increases. The presence of corn spurrey and wild radish is significant in assemblages in Orkney and Shetland – corn spurrey because it appears to be indicative of expansion onto the sandy soils in association with oat cultivation, and wild radish because it may indicate well-manured infield land for barley.

Corn spurrey has traditionally been associated with flax and spring-sown barley (Bond *et al.* 2007). It has been found in Norse contexts at Pool, Orkney, before the introduction of flax, and seems to increase in abundance along with cereals on acid, sandy soils and is associated with the expansion of oat cultivation as an outfield crop. In the case of Cille Pheadair, however, the sandy soils of the machair are mostly calcareous in character.

It would seem most likely that free-draining machair was used for the cultivation of flax, along with the newly introduced and tolerant rye. It is possible that new areas of machair were brought into cultivation for these crops, so that the main crops were not compromised. This would have left the more fertile, least unstable areas of machair for the main barley crops. Alternatively, a shift to the blackland was underway, and this land was now used for the main crops.

There are several possible reasons for the increase in plants tolerant of acidic conditions over the lifetime of the settlement, such as general or localized acidification of the agricultural soils, the cultivation of different land with a lower pH, or the collection of plants from land with more acidic soils.

As well the increase in species tolerant of acidic soils, equally clear is an increase in grassland plants which occurs alongside an increase in perennial weeds. This could reflect the gathering of plant materials from the heathland and blackland areas, or it could signify new land being brought into cultivation as part of an expanding agricultural system and the intensification of cereal production.

It is significant, therefore, that in phase 7 there is an increase in the frequency of wild radish, corn spurrey and sheep's sorrel, all arable weeds found most commonly on acidic soils. This is likely to indicate cultivation of organic-rich, low-lying machair where it meets the peatland soils of the blackland itself.

It is likely that the Norse period at Cille Pheadair saw major changes in the existing agricultural system. Rye and flax were now cultivated on the machair and, further east towards the inland edge of the machair plain, new areas of arable land, capable of withstanding heavier cropping, were used for crops that demanded better fertility.

The weed assemblage at Cille Pheadair indicates that more open, acidic grassland was brought into cultivation during the occupation of the settlement. The presence at Cille Pheadair of corn spurrey and wild radish in larger numbers than many of the other weeds of arable represents an interesting inversion of the pattern seen at prehistoric sites on Shetland (Holden 1998). With the introduction of bristle oat in Shetland's Norse period, numbers of wild radish and corn spurrey increased. As these are most common on non-calcareous soils, their increase would be consistent with use of the poorer areas of acidic sandy land as outfield for the intensive cultivation of oats.

As has been previously argued (Fenton 1978a; Holden 1998; Bond 2007), the introduction of oats into the arable system was of great importance because this crop grows well on poorer soils. Oats yield well even in the second and third years of rotation without further fertilizer, thereby putting no additional strain on a system in the process of expansion. When looking at Cille Pheadair, it is not possible to be sure whether the agricultural regime involved the cultivation of bristle oat on the sandy machair as outfield, or common oat on the blacklands after the barley crop had been taken.

At Cille Pheadair, however, the increase in wild radish and corn spurrey could indeed reflect an increase in the use

of non-calcareous land, but now as infield, in those areas where the loamy, peaty, low-lying machair merged with the blackland. It is more likely that the calcareous machair was now treated as outfield for cultivating rye (which increased dramatically in phase 7) and probably for flax.

Conclusion

Increases in weeds tolerant of acid soils, in species of grassland and heath (unit 5), and in perennials by phase 7 all support an interpretation of at least some cultivation of the blackland, the non-calcareous land on the inland edge of the machair. Several perennial weed species in the assemblage that are indicative of grassland (*e.g.* heath grass, grasses, ribwort plantain and sheep's sorrel) could have grown as weeds of crops on this newly cultivated acidic ground.

The increase in perennial species could reflect an expansion onto more marginal areas of arable land in response to the introduction of rye and flax, both suited to free-draining soils, possibly on the drier reaches of the machair (Smith and Mulville 2004).

The increase in oat, tolerant of wetter soils, also ties in with this evidence from the weed data. The reasons for this change might have been down to the less demanding requirements of oats, freeing up the machair arable areas for the primary crop (barley) and the more particular crops of flax and rye.

An increase in weed species tolerant of moisture, indicating cultivation of damp ground, may be expected if there was an expansion of cultivation onto wetter soils. Although the indicator values for moisture tolerance in the Ellenberg analysis do not show a particular change, there are still species in the assemblage that are associated with damp and wet ground (*e.g.* chickweed, creeping buttercup, blinks). Furthermore, it is possible that better drained areas on the blackland were selected for cultivation.

Such a move to blackland cultivation in the eleventh and twelfth centuries at Cille Pheadair might have preceded the deterioration in climate that occurred in the late thirteenth century (Oram and Adderley 2010). Subsequent medieval settlements in South Uist might thus have been suitably adapted to this climatic downturn. Lower summer and winter temperatures would have shortened the growing season, lessening the amount of grazing available for livestock and increasing pressure on the fragile machair arable fields. Over-cultivation of the easily destabilized machair, coupled with increased potential for storms and inundation by sea or sand of the coastal plain, might have resulted in some losses of both arable land and crops.

Use of the blackland soils for crops such as oats that are tolerant of wetter soils and grow well on the blackland nowadays (Smith 1994), or for the production of hay to support livestock over winter (needed in greater quantities if the growing season was shorter and grazing on the machair was threatened) would have marked a deliberate change in agricultural strategy.

21.2 The wood charcoal macro-remains

P. Austin

The recovery of wood charcoal macro-remains from contexts directly associated with the sequence of Norse-period longhouses and other structures at Cille Pheadair provides the opportunity to investigate both the probable character and composition of the contemporary, local woody vegetation and the exploitation of wood, specifically as fuel, throughout the phases that the settlement was in use. Analysis of the wood remains also reveals significant changes in both the use of wood and potential woodland resources over time.

Methods

Charcoal remains from each phase (1–9) represented in the various structures, pits and associated middens were analyzed to recover, as much as possible, a complete account of the taxa present for each phase. Charcoal from the site was recovered manually and through flotation. To decrease the possibility of bias being introduced through recovery methods, selection of material for analysis focused on flot and residue samples. In instances when hand-picked material was examined, flot and residue material from the same context were also analyzed. Sampling and recovery methodologies are described in Chapter 1 and in section 21.1, above.

Investigating the use of wood for fuel is of particular interest. Charcoal remains from hearths provide direct evidence of the trees and shrubs available, and actually used, for fuel and can provide an insight into whether or not particular woods were subject to some form of selection/avoidance regarding their use. The analysis of charcoals from hearths and hearth-associated contexts was therefore considered a priority in this study. Where hearth material was not available or was insufficient for a full analysis, and for comparison with hearth remains, charcoals from floor, pit and midden contexts were also investigated. Small quantities of charcoal were recovered from postholes and stakeholes and these were examined as potential sources of evidence for the structural use of wood.

Analysis of the charcoal fragments followed standard procedures as described in Hather (2000). Up to 100 fragments per sample/context were examined in accordance with recommendations made by Keepax (1988) in her study of taxon recovery rates from archaeological samples from sites in the UK. Where fewer than 100 fragments were available, 100% of the sample was analyzed. Only fragments >2mm were examined and preferentially, when available, >4mm fragments.

Where *cf* precedes the name of a taxon, this denotes that it anatomically resembled a particular genus but certain identification was not possible. Where it was impossible to differentiate between genera bearing close anatomical similarity, both possibilities are given, *e.g.* *Salix/Populus* sp. Schweingruber (1990) and Greguss (1954) were

Table 21.6. Summary of taxon presence in the charcoal assemblage: fragment count and weight by phase

Taxon	Common Name	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5		Phase 6		Phase 7		Phase 8		Phase 9		All Phases	
		Qty.	Wt. (g)	Qty.	Wt. (g)	Qty	Wt. (g)	Qty	Wt. (g)	Qty	Wt. (g)	Qty.	Wt. (g)	Qty	Wt. (g)	Qty	Wt. (g)	Qty	Wt. (g)	Qty	Wt. (g)
Calluna vulgaris	Heather, Ling	50	0.873	66	0.687	117	1.801	204	3.017	130	2.645	31	0.453	182	3.616	238	2.783	83	2.708	**1101**	**18.583**
Larix sp.	Larch	7	0.148	6	0.065	9	0.194	–	–	39	0.456	–	–	40	0.65	14	0.074	30	0.811	**145**	**2.398**
Betula sp.	Birch	31	2.1	32	0.368	18	0.827	15	0.499	–	–	5	0.037	18	0.827	5	0.082	13	0.197	**137**	**4.937**
Larix/Picea	Larch/Spruce	18	0.122	3	0.008	2	0.011	1	0.002	10	0.008	–		68	0.568	4	0.029	5	0.108	**111**	**0.856**
Corylus avellana	Hazel	26	1.363	14	0.16	–	–	7	0.309	5	0.031	3	0.012	7	0.111	3	0.093	1	0.029	**66**	**2.108**
Alnus glutinosa	Alder	17	1.624	3	0.028	3	0.02	4	0.022	9	0.044	–	–	15	0.603	4	0.234	8	0.109	**63**	**2.684**
Pinus sp.	Pine	1	0.041	–	–	2	0.039	17	0.176	2	0.017	7	0.035	16	0.276	–	–	–	–	**45**	**0.584**
Salix/Populus sp.	Willow/Poplar	3	0.05	3	0.015	3	0.020	3	0.048	1	0.004	6	0.024	3	0.026	2	0.011	11	0.228	**35**	**0.426**
Quercus sp.	Oak	–	–	1	0.005	4	0.042	–	–	–	–	9	0.105	6	0.071	2	0.037	2	0.101	**24**	**0.361**
Prunus sp.	Blackthorn, Cherry	1	0.006	1	0.005	–	–	–	–	–	–	1	0.001	13	0.633	–	–	–	–	**16**	**0.645**
Fraxinus excelsior	Ash	1	0.054	1	0.003	–	–	1	0.001	–	–	–	–	2	0.011	–	–	1	0.066	**6**	**0.135**
Lonicera sp.	Honeysuckle	–	–	1	0.015	1	0.003	–	–	1	0.002	–	–	4	0.067	–	–	3	0.059	**10**	**0.146**
Picea sp.	Spruce	2	0.008	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	**2**	**0.008**
Rosa sp.	Rose	–	–	1	0.108	–	–	–	–	–	–	–	–	1	0.011	–	–	5	0.488	**7**	**0.607**
Sorbus sp.	Rowan, Whitebeam	1	0.356	–	–	–	–	–	–	–	–	–	–	–	–	2	0.020	–	–	**3**	**0.376**
cf *Ilex aquifolium*	Holly	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	0.016	**1**	**0.016**
cf *Sambucus nigra*	Elder	–	–	–	–	–	–	–	–	1	0.009	–	–	–	–	–	–	–	–	**1**	**0.009**
Ulmus sp.	Elm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	0.004	–	–	**1**	**0.004**
Indeterminate		24	0.492	20	0.745	15	0.146	65	0.506	2	0.002	38	0.715	18	1.125	25	0.25	16	0.074	**223**	**4.055**
TOTALS		**182**	**7.237**	**152**	**2.212**	**174**	**3.103**	**317**	**4.58**	**200**	**3.218**	**100**	**1.382**	**393**	**8.595**	**300**	**3.617**	**179**	**4.994**	**1997**	**38.938**

consulted to aid identification. Nomenclature follows Stace (1997).

To evaluate the relative abundance of each wood represented, fragment counts for each taxon were recorded as the analysis of each sample progressed, whilst the aggregate weight of each taxon was recorded for each sample from each context. The ubiquity of each taxon, that is the total number of individual samples/contexts in which a taxon was present (Popper 1989), was also recorded as a further aid to better understand taxon abundance in each phase.

Results

Table 21.6 lists the taxa identified in each phase and summarizes the quantity of fragments and weight recorded for each taxon for each phase. Table 21.7 shows taxon ubiquity for each phase and for the assemblage overall.

A total of 1,997 fragments from 85 samples recovered from 40 contexts were studied, resulting in the identification of 18 taxa, of which all but Larch (*Larix* sp.) and Spruce (*Picea* sp.) are native to the UK. When possible, differentiation between Larch and Spruce fragments was made according to the presence/absence of biseriate bordered pitting in vertical tracheids and abrupt/gradual early–late wood transition respectively. In phases 1 and 2 some fragments retained growth rings from several seasons and it was possible to determine that two fragments were Spruce rather than Larch. Typically, Larch/Spruce fragments were very narrow, retaining only one or two growth rings.

Where it proved impossible to differentiate between these taxa, fragments were recorded as a separate taxon: *Larix/Picea* sp. Pine (*Pinus cf sylvestris*) was the only other softwood identified. Though *Prunus* spp can be distinguished anatomically, the small size and poor condition of the *Prunus* fragments prevented differentiation. For much the same reason, it was not possible to differentiate between Willow and Poplar or to identify to species level fragments of *Sorbus,* Honeysuckle*,* Elm and Birch. The two native deciduous Oaks (*Quercus petraea* and *Q. robur*) are indistinguishable anatomically.

Fragment condition

There were no significant differences in the physical condition of fragments between individual samples, contexts or phases. Most fragments could be described as in good to poor condition. The great majority of fragments showed high levels of thermal degradation though none were observed to be 'vitrified'. Though recording evidence of biodegradation was not always consistent, fungal hyphae were present in many fragments and not confined to particular taxa. It was noted that fungal hyphae were frequently, though not always, present in Larch/Spruce, Hazel, Alder, Birch and Willow/Poplar. Mineral deposition was occasionally present in fragments but was rarely extensive.

Taxon representation and ubiquity

The number of samples studied from each phase varied: the numbers of contexts and samples is shown in Table 21.7. This disparity in sample quantities limits the ability to fully evaluate the ubiquity of each taxon in some phases. Meaningful inferences can, however, still be made.

Heather and Willow/Poplar are the only taxa represented in each of the nine phases. Heather is also the most ubiquitous taxon in each phase: with the exception of two contexts in phase 2, Heather is present in every context. Hazel is represented in every phase except phase 3 and Birch is absent only in phase 5. Out of seven samples from phase 5, only two produced more than two taxa (Heather and Hazel). Alder and undifferentiated Larch and Spruce are absent only from phase 6. Oak is absent from three phases (phases 1, 4 and 5) and Pine from three (phases 2, 8 and 9). The remaining taxa identified were recorded in five or fewer phases. Elm, Elder and Holly were each recorded in one sample from one context in one phase only.

Discussion

Taxon representation

The majority of taxa identified are native to Scotland, though some are now regarded as being locally extinct. The identification of two alien taxa, Larch and Spruce, is particularly interesting. The presence of these woods is believed to represent the opportunistic exploitation of driftwood. It is possible that some of the other woods represented were also gathered as driftwood but this can not be demonstrated on the evidence available.

Both Larch and Spruce have species (notably *Larix decidua* and *Picea abies)* native to continental Europe. The means by which wood of European species of Larch and Spruce could have been transported to South Uist is convoluted. It would have required movement from an inland area towards the sea and, once in the sea, a direction of travel against prevailing currents. Whilst not impossible, especially if human intervention occurred, it is improbable. A more plausible explanation is that these two taxa were conveyed from the North American coast via the North Atlantic Current (NAC) onwards toward the North Atlantic Drift Current (NADC), which passes close to the Hebrides (Rowe *et al*. 2001–2008). This is the route, identified by Dickson (1992) in his review of driftwood washed up on the shores of the northern and western islands of Scotland, that best explains the occurrence of alien taxa, including Larch and Spruce, in archaeological contexts. This driftwood was typically used as fuel and in constructions.

None of the Larch or Spruce fragments in this assemblage could be identified to species. However, *Larix laracina* (Tamarack)*,* a native of North America, has been identified among waterlogged wood elements from 10km away at the Middle Iron Age site of Dun Vulan (Taylor 1999). The identification of a non-European species of Larch on South Uist supports the inference that the Larch and Spruce charcoals identified in the Cille Pheadair assemblage also came from North America as driftwood and were not

Table 21.7. Taxa ubiquity in the charcoal assemblage, showing ranking by sample/context

Taxon	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5		Phase 6		Phase 7		Phase 8		Phase 9		All Phases	
	Samps (8)	**Ctxts (8)**	**Samps (6)**	**Ctxts (6)**	**Samps (8)**	**Ctxts (3)**	**Samps (16)**	**Ctxts (4)**	**Samps (7)**	**Ctxts (3)**	**Samps (6)**	**Ctxts (2)**	**Samps (15)**	**Ctxts (7)**	**Samps (15)**	**Ctxts (3)**	**Samps (4)**	**Ctxts (4)**	**Samps (85)**	**Ctxts (40)**
Calluna vulgaris	8	8	4	4	7	3	16	4	7	3	6	2	15	7	15	3	4	4	**82**	**38**
Alnus glutinosa	4	4	1	1	2	2	2	2	2	2	–	–	6	5	3	2	3	3	**23**	**21**
Betula sp.	5	5	4	4	2	1	6	3	–	–	4	2	5	2	3	1	2	2	**32**	**20**
Corylus avellana	4	4	3	3	–	–	5	3	2	2	2	1	5	4	3	2	1	1	**25**	**20**
Larix/Picea	3	3	3	3	2	2	1	1	1	1	–	–	9	4	3	2	3	3	**24**	**19**
Salix/Populus sp.	2	2	2	2	3	2	2	2	1	1	3	2	1	1	2	2	4	4	**20**	**18**
Larix sp.	1	1	1	1	3	2	–	–	2	2	–	–	3	3	4	3	3	3	**17**	**15**
Quercus sp.	–	–	1	1	2	2	–	–	–	–	3	2	4	4	2	2	1	1	**14**	**13**
Pinus sp.	1	1	–	–	2	2	8	3	1	1	5	2	3	3	–	–	–	–	**20**	**12**
Prunus sp.	1	1	1	1	–	–	–	–	–	–	1	1	4	2	–	–	–	–	**7**	**5**
Fraxinus excelsior	1	1	1	1	–	–	1	1	–	–	–	–	2	2	–	–	1	1	**6**	**6**
Lonicera sp.	–	–	1	1	1	1	–	–	1	1	–	–	1	1	–	–	2	2	**6**	**6**
Rosa sp.	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	2	2	**4**	**4**
Picea sp.	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	**1**	**1**
Sorbus sp.	1	1	–	–	–	–	–	–	–	–	–	–	–	–	2	1	–	–	**2**	**1**
cf *Ilex aquifolium*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	**1**	**1**
cf *Sambucus nigra*	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	**1**	**1**
Ulmus sp.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	**1**	**1**
Total no. taxa	**12**		**12**		**9**		**8**		**9**		**7**		**12**		**10**		**12**		**18**	

European species transported by unknown means from mainland Europe.

Taxon abundance

The quantification of wood charcoal is complicated by, alongside other taphonomic factors, post-fire disturbance, the fragile and fragmentary nature of the material itself, and the physical attributes of the pre-charred wood. There is no clear or direct correspondence between the quantity of fragments present and the quantity of wood used of a particular taxon. Neither fragment counts nor weight are sufficiently reliable on their own to determine the relative abundance of a taxon.

In this study Heather, for example, is typically the most abundant taxon when measured by fragment count but is not always so by weight (see Table 21.6). In sample 6634 (context 366), for example, two fragments of Hazel weigh 0.109g against ten fragments of Heather weighing 0.101g. In the case of Heather, this disparity arises because of the small dimensions of Heather as a living plant and subsequently as charcoal. In contrast, the greater dimensions of wood from tree taxa (*e.g*. Oak, Ash and Hazel) typically produce larger fragments when charred that have correspondingly greater mass.

Differential fragmentation may also affect apparent abundance. It was noted in this study that fragments of Larch charcoal tended to break up more readily on handling than any other taxon identified, for reasons that are uncertain. On the other hand, Heather fragments remained solid and resistant to further fragmentation. The apparent greater susceptibility to fragmentation of Larch charcoal suggests that it may be over-represented (as measured by fragment count) in individual samples in this study.

Taxon presence by phase

Phases 1 and 2: The charcoals studied were recovered from the enclosing sandbank and associated sand fill (contexts 321, 342, 354 and 453), pit deposits (contexts 580, 605, 617, 624, 643 and 707), a posthole fill (context 637) and a stakehole fill (context 641), and two peat ash surfaces (579 and 622). These phases together contained a higher number of taxa (15 of the 18 taxa identified) than the later phases. Though probable, it is unknown whether the charcoal in the sandbank and fill deposits is derived from discarded fire waste. It is, however, highly likely that the charcoal from contexts 579 and 622, the peat ash surfaces, derives from fuel waste. Whatever the original function of the pits, the charcoal recovered from them probably represents dumping of fire debris prior to the construction of the first longhouse (House 700) or its hearth.

Charcoal from the posthole and stakehole fills potentially includes remains of the former post and stake. Of the two taxa, Heather and Hazel, identified from the posthole fill, only Hazel could have produced wood suitable for use as a post. Hazel is represented by one fragment and Heather by two fragments. A single fragment is insufficient evidence to infer that the Hazel charcoal represents the remains of a post. The stakehole fill (641) contained three taxa: Alder, Hazel and Heather. Heather is represented by two fragments of twig wood. Wood of either Alder or Hazel, each represented by five fragments, could have been used as a stake. Again it is inconclusive whether any of the charcoal derived from structural wood. Curvature of growth rings suggests that all the fragments of Hazel and Alder in these contexts derive from small round wood. This, the low quantity of charcoal recovered from these fills and the presence of Heather suggest that the charcoal in both contexts derives from intrusive material introduced at an unknown stage.

The pit samples seemingly contain a greater range of taxa than the other context types from these phases. However, it is unclear if this reflects actual use of a broader range of taxa or is a consequence of the relatively high quantity of fragments examined from the six individual pit deposits studied. If a greater number of samples and fragments from 'non-pit' contexts had been studied, it is likely that more taxa would have been recovered from these context types.

Allowing for the difference in the quantity of material studied from particular context types, no significant difference is apparent in the composition of samples from phase 1 and 2 deposits. Heather, represented by 116 fragments (1.560g) in 12 of the 14 samples, dominates the two phases, followed by Birch (63 frags, 2.468g), Hazel (40 frags, 1.523g), Larch/Spruce (21 frags, 0.130g), Alder (20 frags, 1.652g) and Larch (13 frags, 0.213g). The remaining nine taxa are each represented by six or fewer fragments and can be considered minor components in this phase.

Phase 3: A total of nine taxa were recovered from the central hearth (context 701) within House 700, from one sample from the southeastern midden (context 134) and one sample from the northeastern midden (context 454). Heather is by far the most common wood in this phase, being represented by 117 fragments (wt. = 1.801g) of a total of 174 fragments (wt. = 3.103g) and occurring in seven of the eight samples examined. Birch (18 frags, 0.827g) and Larch (nine frags, 0.194g) are the next most common taxa. The remaining six taxa are each represented in no more than three samples by four fragments (Oak) or fewer (Larch/Spruce, Alder, Pine, Willow/Poplar, Honeysuckle).

The hearth remains indicate that Heather was a significant component of the fuel used. However, the 55 Heather fragments (0.7g) are out-weighed by the 18 fragments of Birch (0.827g) from this context. The Heather is believed to have been burnt in the form of peat, though some could also have been used as tinder. Birch, Alder and Willow/Poplar could have been charred both incidentally, as a component of peat, and purposefully as wood. Oak, Larch, Larch/Spruce and Pine are most likely to have been used in the form of wood only, mostly as small branches that were collected opportunistically. A similar pattern is evident from the midden samples, in which Heather is again the dominant taxon, suggesting that the midden deposits do indeed include hearth debris.

Phase 4: A single sample came from the southeastern midden and the rest of the samples from this phase were recorded as two sub-phases. The samples grouped as sub-phase 4i came from the hearth of House 500 (context 555) and from the lower floor/hearth deposits (context 370) of Structure 353, the north room. Apart from the presence of Willow/Poplar in context 370, the assemblage from hearth/floor deposits of Structure 353 more or less replicates the assemblage from the hearth deposits of the longhouse itself.

A total of 82 fragments (1.957g) of Heather were identified from hearth 555 in House 500; 11 fragments (0.476g) of Birch, five Pine fragments (0.123g) and two Hazel fragments (0.170g). In the samples from floor 370 of the north room, 63 fragments (0.561g) of Heather, three Birch fragments (0.021g), two Hazel fragments (0.024g) and one fragment each of Pine (0.002g) and Willow/Poplar (0.009g) were identified. The charcoal assemblage supports the observation made during excavation that the north room had a small hearth (371) in the centre of floor 370.

Samples from the north room's later floor/hearth (context 366) were grouped as sub-phase 4ii. Floor 366 lay above floor 370, and near its centre was a small hearth (383). Eight taxa were identified in total: Alder, Ash, Birch, Hazel, Heather, Larch/Spruce, Pine and Willow/Poplar. Of these eight, Heather, represented by 46 fragments (0.437g), is the most common in the floor/hearth samples (366). Pine (11 fragments, 0.051g) is the next most common taxon, followed by Hazel (3 fragments, 0.115g). Alder (0.016g) and Willow/Poplar (0.039g) are represented by two fragments and Birch, Ash and Larch/Spruce are each represented by one fragment (0.002g each).

For phase 4 overall, of the eight taxa identified, Heather is the most widely represented, found in all 16 samples. The next most ubiquitous taxon, Pine, is present in eight samples (17 frags, 0.176g). Birch (15 frags, 0.499g) is present in six samples, Hazel (seven frags, 0.309g) in five samples, and Willow/Poplar and Alder in two samples. Larch/Spruce and Ash are each present in one sample only. The ranking of taxa in this phase is in keeping with the general pattern evident from the earlier phases of occupation.

Phase 5: This phase is represented by single samples from the southeastern midden (context 114) and an abandonment fill (context 023), as well as five samples from hearth 503 within House 500 Stage II. Only four taxa were identified in the midden sample. Heather is the most common taxon (29 frags, 0.928g) followed by Larch (18 frags, 0.244g). Pine is represented by two fragments (0.017g) and Alder by one fragment (0.006g). In contrast, at least seven taxa were identified in the abandonment fill (Larch, Larch/Spruce, Alder, Heather, Hazel, Honeysuckle, Elder and Willow/Poplar), even though the same number of fragments (50) was examined.

The nine taxa identified from phase 5 do not indicate a significant difference in the range of taxa, or their relative abundance, in this period compared to other phases. As with the other midden deposits (see below), most of the charcoal probably derived from debris accumulated successively from the maintenance of numerous hearths.

Only two taxa – Heather and Hazel – are represented in the hearth samples from House 500 Stage II. There is, therefore, a striking disparity between the range of taxa represented in House 500's phase 5 hearth samples (context 503) and either those from the phase 5 midden/abandonment or those from the phase 4 floor/hearth samples of its earlier inhabitation (contexts 555, 370 and 366). The near-exclusive presence of Heather in hearth 503 suggests that the wood of other taxa was not burnt. It appears then that hearth 503 was either purposefully kept free of other woods or that none were available.

There is a significant distinction between phase 4 and phase 5 within House 500 in terms of sample composition, though it is not apparent in the two phase 5 midden/abandonment samples. It may reflect a shift in fuel-collecting behaviour rather than the composition of the local vegetation.

Phase 6: A total of 100 fragments from six samples recovered from two floor contexts (382 and 394) from Shed 406 were examined. Heather is the most ubiquitous of the seven taxa identified, being represented in all six samples by a total of 31 fragments (0.453g). Pine is present in five samples, followed by Birch (four samples), Willow/Poplar and Oak (three samples), Hazel (two samples) and *Prunus* sp. (one sample).

Nineteen of the 50 fragments from context 382 could not be identified. Of the remaining 31 fragments, 14 are Heather (0.156g). Oak is the next most common taxon (five frags, 0.052g) followed by Pine (0.013g), Hazel (0.012g) and Willow/Poplar (0.003g) each represented by three fragments. Prunus sp. (0.001g) is represented by a single fragment. The 50 fragments examined from context 394 yielded 17 fragments of Heather (0.297g), four fragments each of Oak (0.053g) and Pine (0.022g) and three fragments each of Birch (0.032g) and Willow/Poplar (0.018g).

The samples from both contexts therefore contained approximately the same taxa in more or less the same ratio as hearth deposits from other phases (in which Heather was also the most abundant taxon). This suggests that the floor deposits in the sheds contained the scattered debris from hearths. This is interesting because no hearth was found in phase 6. Note, however, that floor 394 appears to have been midden debris re-used as a floor surface, so it is not surprising that material deriving from hearths occurs in this deposit even in the absence of a hearth associated with its phase 6 use as a shed floor. In this phase, the occupiers of the ephemeral structures presumably lived elsewhere in the vicinity, and a larger house with a hearth might, for example, have been destroyed by coastal erosion prior to excavation.

Phase 7: Eight of the samples from this phase were from hearth 205 and floor 214 within House 312, two were from the small hearth (059) in Outhouse 006, two were from the northeastern midden (009 and 036), one from a gully fill (022) and one from the northwestern midden (035).

In total, nine taxa were identified from hearth 205, floor 214 and hearth 059. Heather is present in all ten samples. The next most ubiquitous taxon is Larch/Spruce which is present in seven samples. Birch is represented in five samples, *Prunus* sp. in four samples. Alder, Hazel and Oak are each present in two samples. Willow/Poplar and Pine are each represented in one sample. Heather (86 frags, 1.304g) and Larch/Spruce (66 frags, 0.516g) are clearly the most common taxa overall. Together these two taxa account for 152 of the 200 fragments examined from this group of contexts.

All 50 fragments examined from the outhouse's hearth (059) were identified as Heather. No other taxon is present. In contrast, hearth 205 contained eight taxa, of which Larch/Spruce is the most common taxon. One hundred fragments from three samples from hearth 205 were examined, of which 44 fragments (0.358g) were identified as Larch/Spruce. Heather is represented by 22 fragments (0.240g). Pine (12 frags, 0.153g) and *Prunus* sp. (nine frags, 0.596g) are the next most common taxa. The four remaining taxa are represented by three fragments (Birch and Willow/Poplar) or two fragments (Alder and Oak) only.

It appears that a greater quantity of Larch/Spruce wood was used in hearth 205 than in any of the other hearths studied. If this is an accurate reflection of wood use, it suggests that Heather was not necessarily the principal fuel component in this instance. The additional presence of other tree taxa suggests that this hearth was predominantly fuelled by wood rather than peat. Larch/Spruce is also dominant (22 frags, 0.158g) in the five floor samples (context 214), followed by Heather (14 frags. 0.123g), suggesting that these samples also contained hearth debris.

However, in both the hearth and floor contexts, Larch/Spruce fragments are typically thin slithers orientated along the longitudinal axis. The small physical size of the fragments is reflected in the fragment/weight ratio for this taxon. The weight recorded for the 44 Larch/Spruce fragments is fairly close to that of the 22 Heather fragments and suggests that Larch/Spruce is perhaps over-represented as fragments.

The other contexts in phase 7 were similar for both the northeastern and northwestern middens and the gully fill, with seven taxa in common and additionally Honeysuckle and *cf Rosa*. In comparison with the charcoal from within House 312, there was no *Prunus* sp., Birch or Willow/Poplar from any of the samples from these contexts outside the house.

Phase 8: Fifteen samples, from House 007's hearths (064 and 065) and floor 004 of Outhouse 006, were investigated from this phase. Heather, present in all 15 samples, was by far the most ubiquitous of the ten taxa identified. Larch was present in four samples only, whereas Alder, Birch, Hazel and Larch/Spruce were present in three samples. Willow/Poplar, Oak and *Sorbus* sp. were present in two samples only. A single fragment of Elm, the only Elm in the assemblage as a whole, was identified in a sample from the floor of Outhouse 006.

In hearth 064, 83 of the 100 fragments were identified as Heather, making this taxon the most abundant of the ten taxa identified. *Larix*, represented by seven fragments, and Birch represented by five fragments are the next most abundant taxa. The remaining taxa – Alder, Hazel, Larch/Spruce and Oak – are each represented by a single fragment. This hearth deposit seems to indicate the use of peat supplemented by various bits of wood. Hearth 065 also closely follows this pattern. Of the 100 fragments examined, 82 were identified as Heather. Again Larch, represented by five fragments, is the next most abundant taxon, followed by Larch/Spruce (three fragments) and *Sorbus* sp. (two fragments). Oak and Willow/Poplar were each represented by a single fragment.

The analysis of floor 004 of Outhouse 006 mirrors the results of the hearth analyses in that Heather is unequivocally the dominant taxon by both fragment count (73) and weight (0.723g) in this context. Though represented by only three fragments (0.184g), Alder is the next most abundant taxon. Hazel (0.087g) and Larch (0.008g) are each represented by two fragments whilst Willow/Poplar and Elm are each represented by a single fragment. The floor debris again seems to derive from fire debris in which peat was the principal fuel. Since there was no hearth in Outhouse 006 during phase 8, this material was presumably brought in from a hearth somewhere else, perhaps from the longhouse.

Phase 9: A total of 179 fragments were examined from four hearth deposits from contexts 042 and 011 (in the ruins of House 007) and contexts 056, 057 (in Hut 031). A total of 12 taxa were identified. Only four samples were examined, making it less certain which taxa are the most ubiquitous. Heather and Willow/Poplar are represented in all four samples; Alder, Larch and Larch/Spruce are each present in three samples; Birch, Rose and Honeysuckle are present in two samples and Hazel, Oak, Ash and Holly are each represented in only one sample.

There was also a disparity in the quantity of material examined from each context: only 15 fragments were examined from context 042, resulting in identification of three taxa; 100 fragments were examined from context 056, resulting in the identification of 12 taxa; 25 fragments were examined from context 057, resulting in identification of six taxa; 39 fragments were examined from context 011, yielding six taxa. The disparity in the number of fragments examined from each context and the number of taxa identified is a consequence of differences in sample size, and demonstrates the value of examining sufficient quantities of charcoal (100 fragments, when available).

Nevertheless, this would seem to be a particularly taxon-rich phase. Each taxon identified from contexts 042, 057 and 011 is also present in context 056 in which all 12 taxa were identified.

This hearth context (056) best represents the full range of taxa exploited during the final phase of use of the site and, not surprisingly, Heather is the most abundant taxon (55 of 100 frags, 2.363g). Larch is the next most common

taxon (15 frags, 0.424g) followed by Willow/Poplar (six frags, 0.167g) and Alder (five frags, 0.085g). Birch and Rose are each represented by four fragments. Each of the four fragments of Rose from this context is relatively large, producing a combined weight of 0.464g, which accounts for the high ranking (second to Heather) by weight but low presence by fragment count. Oak is represented by two fragments, also relatively large (0.101g). Hazel, Ash, Larch/Spruce and Honeysuckle are each represented by a single fragment in this sample.

For the phase overall, Heather is again by far the most abundant taxon (83 of 179 frags), followed by Larch (30 frags), Birch (13 frags), Willow/Poplar (11 frags) and Alder (8 frags). The remaining taxa are each represented by five or fewer fragments. Willow/Poplar (0.228g) is higher ranked by weight than Birch (0.197g) and *Rosa* ranks higher than both these taxa by weight (five frags, 0.488g). The preponderance of Heather and comparatively high occurrence of wetland taxa (Alder, Willow/Poplar and Birch) in this phase suggest that peat was the main fuel used, supplemented by opportunistically available wood, notably Larch/Spruce.

Overview of taxon abundance and representation

The results of this analysis show that the most abundant taxon by all criteria in most instances is Heather. For the assemblage as a whole, Heather accounts for 55% of all fragments. It is present in 38 of the 40 contexts and 82 of the 85 samples examined. Heather is present in all nine phases and is the most ubiquitous taxon by far in all but phase 9 contexts, where it is joint most ubiquitous taxon with Willow/Poplar (present in four samples each). Even then, it is significantly more abundant than any other taxa identified in phase 9 by fragment count and weight.

The overall ranking of taxa, excluding Heather, is not so clear. No consistent pattern emerges when the results from each phase are compared. Certain taxa are more common than others but no single wood clearly dominates every phase in the way noted for Heather. None the less, the most ubiquitous taxon overall is Willow/Poplar (present in every phase). Birch, Hazel, Alder and Larch/Spruce are all present in eight phases; Larch is present in seven phases; Pine and Oak are present in six phases. The ubiquity of these taxa suggests that they were more readily available, albeit sporadically, and that, when available, they were probably collected in some quantity and favoured over alternatives. No doubt the size of the branch wood collected varied and this is also reflected in the quantities recorded for individual taxa.

Clearly some taxa can be considered rarities in that they are represented by very few fragments and are present in fewer than three phases (*i.e.* Elm, *Sorbus* sp., *Rosa* sp., Elder and Holly). Though apparently uncommon, Spruce may actually be better represented than was possible to establish with certainty because fragments of Spruce are probably present among the undifferentiated Larch/Spruce fragments. These taxa were undoubtedly rare as living plants on South Uist, if they were there at all. Alternatively, they might have been only very occasionally available from beyond the island, transported either naturally as driftwood or in some other form, such as artefacts.

Wood use

It is almost certain that the vast majority of the woods identified represent wood used directly or, as in the case of Heather, indirectly as fuel. It is equally plausible, however, that charcoal deriving from wood initially used for purposes other than as fuel is also represented. Wood from artefacts, or used in the construction of houses or boats, or initially used for other functions such as bedding or furniture, may be represented. Charring would have occurred following the end of a wood's useful life.

Heather, for example, has been used extensively in the Western Isles of Scotland as a roofing material, as a source of light (torches), for bedding, brushes and baskets (Lambie 2000). It is quite probable that some Heather charcoal fragments derive from non-fuel uses but cannot be recognized as such. Unfortunately, differentiating between charcoal fragments derived from wood purposefully burned for fuel from that incidentally burnt on a hearth, or that used for some ritual or symbolic purpose is not possible and, as such, these alternatives are conjectural.

Fuel

To better understand the exploitation of wood for fuel, the majority of context types investigated were hearths or floor deposits associated with hearths. It is believed that the consistent high presence of Heather in the deposits indicates that peat rather than wood *per se* was the principal fuel used throughout the centuries of occupation. The roots, stems and twigs of Heather would have been contained within the peat. No root wood of Heather was identified here but fine twigs (of 1–3 seasons' growth), stemwood and larger branches (some with 10–15+ seasons' growth) were identified.

Had wood of trees and larger shrubs been readily available for fuel, it would almost certainly have been used on a regular basis. This would have been reflected in the samples by significantly greater quantities of charcoal from tree and large shrub taxa than was actually recovered, and by a much less conspicuous presence of Heather. Also the curvature of growth rings and the presence/absence of outermost wood and/or bark suggest that most of the wood represented was unmodified round wood, being small branches and twigs rather than the remains of large branches/stems or timber. This is believed to indicate that the majority of the woods were used primarily for kindling rather than as the main fuel. If so, the volume of wood used at any given time would not have been substantial apart from the occasional use of larger branches when they became available, through the collection of driftwood for example.

It seems that wood from trees and shrubs was acquired opportunistically as and when it became available. In

most instances, branches would have been collected as deadwood, as suggested by the evidence for pre-charring biodegradation (the presence of fungal hyphae). Many of the woods represented are among some of the most highly regarded fuel woods (*e.g.* Oak, Ash, Elm, Hazel and Alder); whilst others, such as elder and, significantly, Heather are poor-quality fuel woods and are unlikely to have been gathered for use as fuel. The inclusion of both good and poor fuel woods supports the inference that wood was collected opportunistically.

Of the taxa identified, there is nothing to indicate a preference for any particular tree or shrub species. Where a taxon is the next most abundant wood (besides Heather), as seen for Larch/Spruce, for example, in House 312's hearth (205; phase 7), it is believed to imply only that this wood was more available than most others at that time, and thus was used to bolster the peat fire. The presence of woods other than Heather is, it seems, almost incidental. Branches and twigs of various trees and shrubs were used when available to supplement the burning of peat. Alder, Birch and Willow might have been present in the peat rather than, or as well as, wood gathered as driftwood or directly from the ground around living or dying trees. These taxa are associated with wetland habitats and, as Heather was, might have become incorporated into the bog matrix as it developed.

The use of peat as fuel, supplemented by driftwood, has been inferred from plant macro-remains recovered from other sites in the Scottish islands from differing time periods. A nearby example is Dun Vulan, a Middle Iron Age broch (Smith 1999) and, further afield, charcoals have been analysed from Bronze Age mounds on Sanday, Orkney (Alldritt 2007). At both sites, Larch/Spruce was identified and Heather was abundant. The Cille Pheadair charcoal assemblage compares favourably with these sites in that Larch/Spruce driftwood and a few native woods were opportunistically acquired as and when available, but peat containing Heather wood was the main fuel.

Comparison to Mound 3 at Bornais (Gale in Sharples 2005) shows some significant differences between that site and the smaller farmstead at Cille Pheadair. At Bornais, alder and Salicaceae occur very infrequently, each being identified in only one sample and one context, whereas at Cille Pheadair alder is present in 53% of contexts and 27% of samples. The less frequently occurring taxa at Cille Pheadair (*e.g.* Elm, Pine, Ash *etc.*) are not recorded at all at Mound 3 (Gale in Sharples 2005: 139, 141, tab. 70).

In his analysis of the material from Mound 1 at Bornais, Gale notes that the very high occurrence of Larch/Spruce charcoal in that assemblage derives from the burning-down of the Late Iron Age wheelhouse – this charcoal is the remains of burnt structural timbers (Gale in Sharples 2012b: 190–1). In his comparison of the Bornais assemblages, Gale highlights the much greater range of taxa present in the Iron Age deposits at Mound 1 when compared to the Norse-period deposits of both Mound 1 and Mound 3, suggesting a possible 'sharp decline in the availability of native timber' (*ibid.*: 191, 229, tab. 65, fig. 143). Larch/Spruce is not abundant at Mound 3 and possibly indicates a reduction in the quantity of driftwood available in the Norse period (*ibid.*). Another feature of the Mound 1 assemblage in strong contrast to the Cille Pheadair assemblage is the very infrequent occurrence of Heather in either the Iron Age or the Norse deposits (*ibid.*)

The non-hearth contexts at Cille Pheadair, including floors but especially pit and midden samples, almost certainly also contain deposits of fire debris. After successive fires, the build-up of charcoal and ash would prevent a hearth from functioning efficiently and thus require its cleaning-out and the re-setting of the fire. Therefore, individual hearth remains probably represent no more than 2–3 individual fire events. Hearth debris therefore represents short periods of activity (feasibly only a single firing episode), whereas the midden deposits are the accumulated remains of an unknown number of fire events. The hearths provide evidence of short-term fuel use whilst the middens provide an amalgamated record of fuel use over the centuries. At Cille Pheadair the ratios of Heather to other woods are fairly consistent both from hearth and non-hearth deposits, suggesting that wood fuel availability remained consistently poor over time.

The contemporary vegetation

The vegetation on South Uist today is dominated by machair along the coastal zone whilst inland wet moorland and agricultural land are the main habitats. Woodland is largely absent. The early post-glacial vegetation is known from pollen cores to have included extensive areas of woodland dominated by Birch and Hazel. Though now locally extinct, Oak, Alder, Ash, Elm and probably Pine were also present (Bennett *et al.* 1990). Woodland declined from about 4000 BP onwards, to be replaced by blanket bog which had been increasing from 5500 BP (Brayshay and Edwards 1996; Edwards 1996; Edwards *et al.* 1995; Fossitt 1996).

The analysis of the Cille Pheadair charcoal assemblages indicates that the local vegetation from the early eleventh century through to the early thirteenth century and beyond, when the farmstead was occupied, would have been conspicuously lacking in woodland and scrub. In many respects, it would have been similar to today's vegetation cover, though areas of relict woodland probably persisted in some areas (Taylor 1999). The composition of any relict woodland would have included those taxa identified here and also recorded in the pollen record.

Whilst it is probable that the majority of the woods identified did grow at some point on South Uist, some – specifically Larch and Spruce – certainly did not. The need to exploit driftwood indicates the paucity of wood on South Uist: the exploitation of any small pockets of woodland for fuel might have been prevented or controlled for reasons unknown.

The presence of Willow/Poplar, Alder, and Birch, all associated with watercourses and wet woodland, indicates perhaps that these trees might have retained an on-going if limited presence in the Cille Pheadair area. The extensive spread of wet, often boggy, soils would have provided

the conditions in which stands of Birch, Alder carr and Willow/Poplar could flourish. Given the low quantities of wood from these taxa – though relatively high overall in the assemblage – if such habitats did persist, they are unlikely to have been substantial. Likewise, although the presence of Oak, Ash and Hazel indicates the potential continued presence of deciduous woodland on the drier soils, the small quantity of charcoal identified from these taxa suggests that deciduous woodland would have been a negligible feature of the landscape.

It is thought more likely that the Norse-period vegetation was characterized by isolated individuals or clumps of the larger tree taxa and patches of scrub, their wood becoming available for use as they aged, shed branches and died. In this respect, the high values for Birch may reflect this process. Birch typically lives less than 100 years and would have been more readily available than Oak, for example, which can live for several hundred years.

Vegetation change and landscape modification

The evidence from the pollen record indicates that deforestation of South Uist occurred early in the post-glacial human re-colonization period (Bennett *et al*. 1990; Brayshay and Edwards 1996) and the results of this study show that woodland failed to re-establish itself, or was prevented from regeneration. Given the apparent scarcity of woodland on the island over a prolonged period, it is impossible to say if it was subject to any form of modification through the application of silvicultural practices as part of a broad resource management regime. Inferring the practice of coppicing or pollarding from the anatomical features of charred branches is contentious. Rackham (1980) argues that a pattern of wide earliest growth rings and narrow subsequent rings is indicative of coppicing. However, no systematic detailed study of the anatomy of coppiced wood compared to un-coppiced wood has been undertaken to confirm this observation. It has yet to be demonstrated unequivocally that consistently distinct growth patterns occur in coppiced wood that can be distinguished from those formed in non-coppiced wood of the same taxon. That said, none of the fragments examined in this study show any evidence of having been subject to a silvicultural regime, *i.e*. coppicing or pollarding, according to the criteria proposed by Rackham (*ibid*.). It is unlikely that wood, in the form of timber, featured significantly as a commodity, if at all, in the economy of the settlement.

Conclusions

The poor representation of tree and shrub taxa and the high incidence of Heather throughout the deposits strongly suggest that peat was the principal fuel at the farmstead in all its phases of occupation. The island's few trees and shrubs and North American driftwood were not reliable sources of fuel and the presence of only small quantities of charcoal from alien and native taxa illustrates the opportunistic exploitation of wood. This pattern does not vary significantly throughout the phases of site use or from the different contexts investigated from each house, pit or midden. The local landscape would have been dominated by moorland with few trees. However, that tree taxa are present suggests that limited areas of relict woodland persisted, only occasionally becoming available as deadwood.

22 Absorbed and visible organic residues

L. Cramp and R.P. Evershed

22.1 Introduction

Twenty sherds were selected from the Norse-period pottery assemblage from Cille Pheadair for the investigation of ancient organic residues. The distributions of preserved lipid components in pottery can be utilized to distinguish fats of various origins, including animal fats, plant waxes, oils and resins. Degraded terrestrial animal fats, characterized by high abundances of saturated fatty acids, specifically palmitic ($C_{16:0}$) and stearic ($C_{18:0}$) acids, can be further classified by the stable carbon isotope composition of individual fatty acids. The $\delta^{13}C$ signature of fatty acids in animal tissues reflects both the source(s) of organic carbon and the metabolism of the organism, and thus may be exploited in order to assign archaeological fats to their origins.

Milk fats are distinguished from adipose fats in ruminant species by more depleted $\delta^{13}C$ values of the $C_{18:0}$ fatty acids (Evershed *et al.* 2002a; 2002b). It is also possible to discriminate between ruminant and non-ruminant (*e.g.* pig) fats from enriched values (+ 4 ‰ to + 7 ‰) which characterize the latter (Evershed *et al.* 1997; Mottram *et al.* 1999), again resulting from metabolic and dietary differences (Koch *et al.* 1994).

It was considered of particular interest to investigate the prevalence of indicators of marine product-processing at this island location. Whilst the fatty acid composition of aquatic species is relatively straightforward to distinguish in fresh fats because of high abundances of polyunsaturated long-chain fatty acids (PUFAs), these highly unsaturated components readily oxidize and are subsequently never detected in residues of archaeological age.

However, more stable biomarkers, including ω-(*o*-alkylphenyl) alkanoic acids (Matikainen *et al.* 2003; Copley *et al.* 2004; Hansel *et al.* 2004; Evershed *et al.* 2008) and vicinal diols (Regert *et al.* 1998; Copley *et al.* 2004; Hansel and Evershed 2009; Hansel *et al.* 2011), have been shown to persist in ancient residues, arising from the degradation of the unsaturated components. In addition, isoprenoid fatty acids, including pristanic acid, phytanic acid and trimethyltridecanoic acid (4,8,12-TMTD) originate from phytol in marine algae and accumulate in organisms further up the food-chain (Ackman and Hooper 1968) and therefore may be observed in residues originating from marine product processing (Hansel *et al.* 2004).

Whilst freshwater lipids are likewise characterized by a similar suite of biomarkers, the compound specific stable carbon isotope values of individual fatty acids will exhibit significantly depleted values (Stear 2008; Evershed 2002a; Craig *et al.* 2007) whilst those of marine origin will display enriched $\delta^{13}C$ values. Given the relatively low concentration of $C_{18:0}$ fatty acid in aquatic fats/oils compared with terrestrial animal fats, a mixture of aquatic and terrestrial products may display compound-specific $\delta^{13}C$ values that are biased towards terrestrial values.

Lipid extracts were prepared and analysed following the methodology described in the technical appendix; briefly, the analytical techniques comprised:

1. *High temperature gas chromatography* for separation and quantification of preserved lipids in extracts.
2. *Gas chromatography/mass spectrometry* (GC/MS) for structural identification of the biomarkers present in selected residues.
3. *GC/MS using selected ion monitoring* for selective, and thus highly sensitive, detection of specific biomarkers that may be present at very low concentrations, specifically ω-(*o*-alkylphenyl) alkanoic acids. The detection of these biomarkers with carbon chain lengths of C_{20} and C_{22} would indicate the presence of long-chain polyunsaturated fatty acids in the original commodities processed in pottery and, hence, are proxies for processing of aquatic products (Hansel *et al.* 2004; Copley *et al.* 2004; Evershed *et al.* 2008).
4. *Stable carbon isotope analysis of individual fatty acids* for discrimination of fats of different origins, namely separation of marine and non-ruminant (*e.g.* porcine) fats from ruminants and, within the latter, dairy from carcass fats (Dudd and Evershed 1998; Dudd *et al.* 1999; Evershed *et al.* 2002a; 2002b).

22.2 Results

Lipid preservation and composition

Lipids were well preserved in the Cille Pheadair residues, with significant concentrations of lipid detected in 75% of sherds investigated, and concentrations of lipid absorbed into the sherd fabric reaching 230 µg g^{-1} sherd, and for the visible residues reaching 1894 µg g^{-1} visible deposit (Table 22.1). The major components comprised saturated fatty acids, dominated by the $C_{16:0}$ and $C_{18:0}$ homologues, in distributions characteristic of degraded animal fats (Figure 22.1A). Wide distributions of triacylglycerols (TAGs; C_{42}–C_{54}) were observed in two residues (Figure 22.1B). These distributions are suggestive of dairy fats, which contain

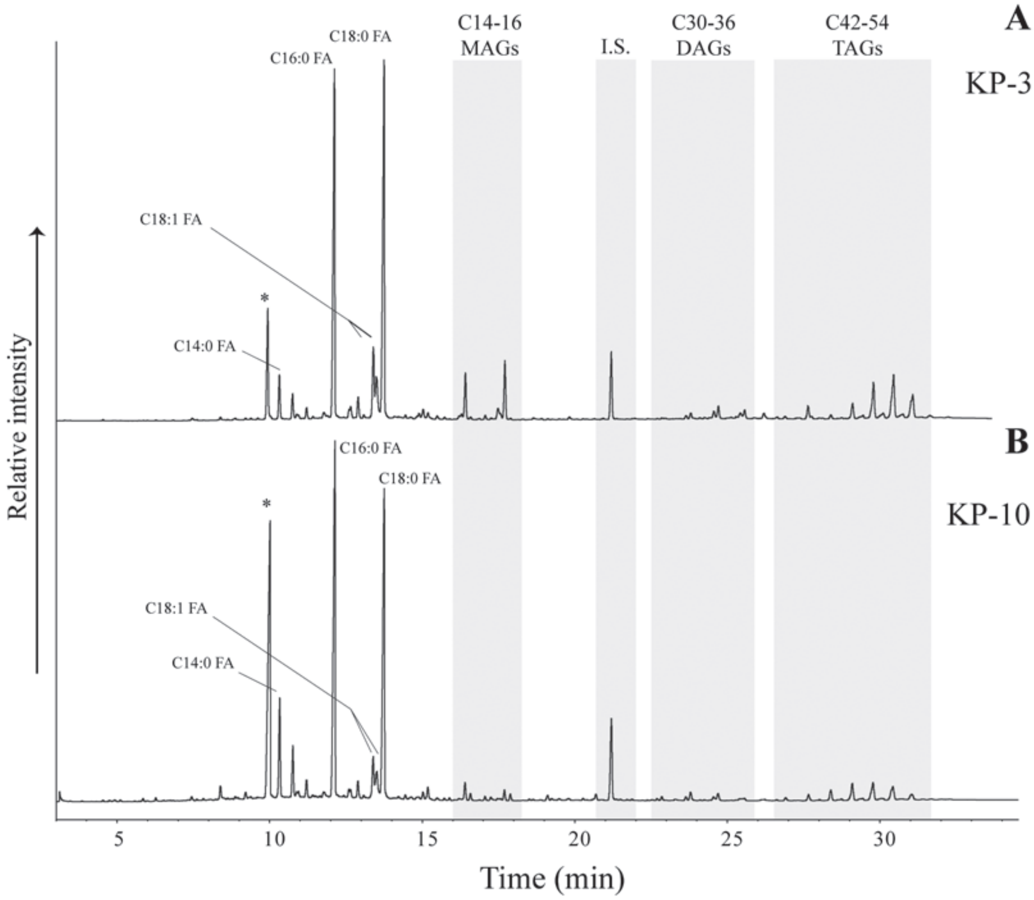

Figure 22.1. Partial high temperature gas chromatograms showing trimethylsilylated TLEs from two Cille Pheadair residues. CX:Y FA – free fatty acid with X carbon atoms and Y degree of unsaturation. MAGs – monoacylglycerols, DAGs – diacylglycerols, TAGs – triacylglycerols, I.S. – internal standard (n-tetratriacontane)

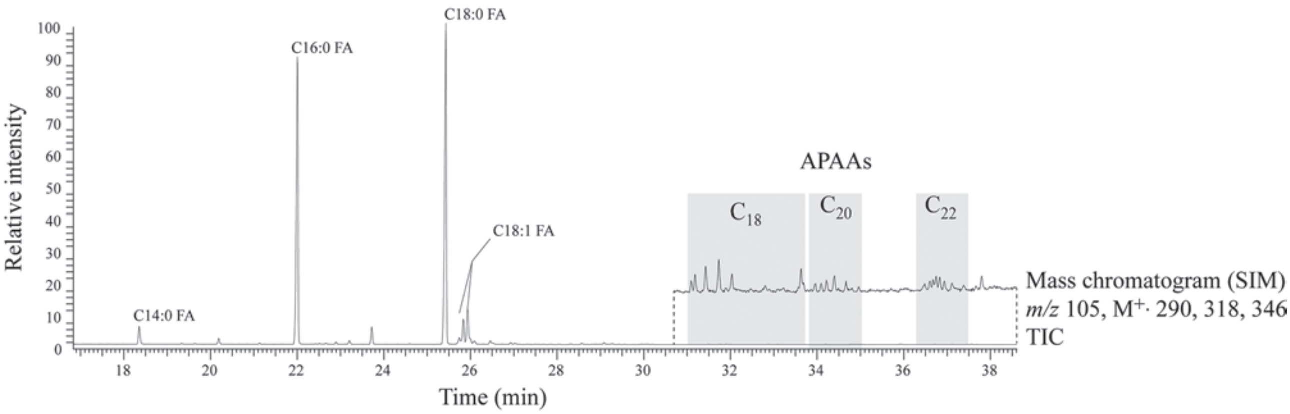

Figure 22.2. Total ion current chromatogram showing the distributions of fatty acid methyl esters (FAMEs) analysed from sherd KP-5M, and (inset) summed mass chromatogram of characteristic APAA fragment ion (m/z 105) and molecular ions (M+. 290, 318, 346) for C18, C20 and C22 APAAs respectively, with the MS operating in selected ion monitoring mode

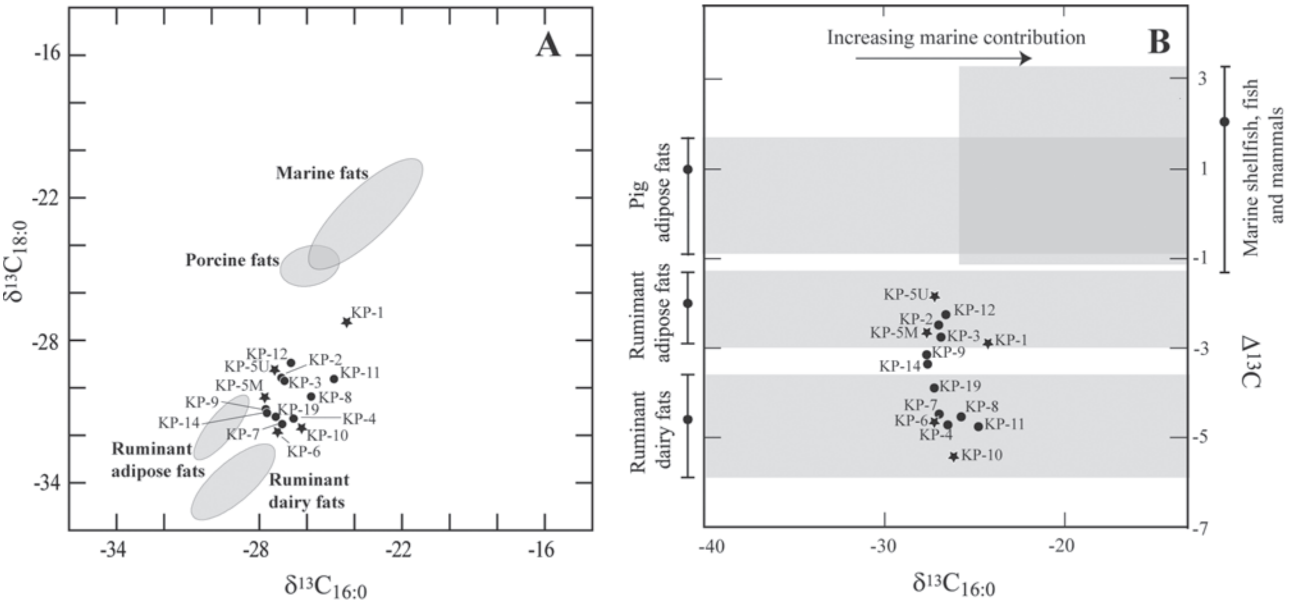

Figure 22.3. Scatter plots of compound-specific stable carbon isotope determinations from the Cille Pheadair residues. A) shows $\delta^{13}C_{16:0}$ plotted against $\delta^{13}C_{18:0}$, with terrestrial animal confidence ellipses (1 s.d.) derived from modern terrestrial reference fats published in Copley et al. 2003 and marine ellipse from modern marine fats (mammals, fish, shellfish and crustaceans; Cramp et al. unpublished data). B) shows $\delta^{13}C_{16:0}$ plotted against Δ13C ($\delta^{13}C_{18:0} - \delta^{13}C_{16:0}$) with ranges on the y axis derived from modern reference fauna as before. Plotting the Δ13C value removes local environmental effects which may shift the absolute $\delta^{13}C$ values of fatty acids and hence have an effect upon the classification of fats

higher abundances of TAGs comprised of shorter-chain (*i.e.* C_4–C_{14}) fatty acid moieties (Christie 1981).

Marine biomarkers

Eighteen residues were analysed as fatty acid methyl esters (FAMEs) using GC/MS operated in selected ion monitoring mode in order to search for ω-(*o*-alkylphenyl) alkanoic acids (APAAs) at much higher sensitivity. The detection of long-chain (C_{20}–C_{22}) APAAs indicates that fats containing long-chain polyunsaturated fatty acids *(i.e.* aquatic species) were processed in the vessel (Figure 22.2).

In total, eight residues contained C_{20}–C_{22} APAAs, comprising 42% of the sherds investigated. Isoprenoid fatty acids, including phytanic and pristanic acid, were further identified in two residues which contained long-chain APAAs; because of a lack of uniqueness to marine organisms (*e.g.* Vetter and Schröder 2011), phytanic and pristanic acid cannot be considered biomarkers for marine fats, but nonetheless are to be anticipated in fats of aquatic origin (*e.g.* Hansel *et al.* 2004).

Compound-specific stable carbon isotope composition

Compound-specific stable carbon isotope analysis was performed upon 15 residues which contained high concentrations of fatty acids (Table 22.1). The findings, presented in Figure 22.3, indicate that whilst marine biomarkers were widely prevalent, the majority were mixed with terrestrial (*e.g.* ruminant carcass or dairy) fats. The source of ruminant fat appears to reflect dairy or carcass fat inputs with roughly equal frequency, and marine products are indicated as mixed with both dairy and carcass fats. One sherd, from a small bowl (KP-1), displays notably enriched $\delta^{13}C$ values compared with the remaining 14 sherds, and was also shown to contain long-chain APAAs. The isotope values suggest that this bowl was used somewhat more intensively for marine products compared with the other vessels.

Discussion and conclusions

The findings discussed here indicate that the products processed in pottery at Cille Pheadair derived predominantly from ruminant terrestrial species (*e.g.* cattle, sheep, goat), and demonstrate that milk products were clearly processed in addition to carcass products. The prevalence of indicators of marine products demonstrates that resources from the sea were also widely exploited, although the stable carbon isotope values indicate that none of the pots investigated was used exclusively for marine products. Pots could therefore have been used for cooking terrestrial and aquatic products together, or used indiscriminately for different products on different occasions.

22.3 Technical appendix

Sherds were photographed, and a portion of any visible carbonized deposits removed using a cleaned scalpel, followed by the cleaning of a small area of the external surfaces of the potsherd using a modelling drill. These

Table 22.1. List of all sherds submitted for organic residue analysis, with those further investigated using GC/MS and GC/C/IRMS highlighted in grey

Sherd lab code	Context	Lipid conc. (µg g⁻¹)	$\delta^{13}C_{16:0}$ ‰	$\delta^{13}C_{18:0}$ ‰	$\Delta^{13}C$ ($\delta^{13}C_{18:0}$ - $\delta^{13}C_{16:0}$)	APAAs	Other biomarkers	Interpretation
KP-1	354, 600, 618	93	-24.3	-27.2	-3.0	C_{18}-C_{22}		Mixture, marine and ruminant fat
KP-2	354, 600, 618	120	-27	-29.6	-2.5			Ruminant adipose fat
KP-2v visible	354, 600, 618	562				C_{18}-C_{20}		Marine fat contribution
KP-3	209	133	-26.9	-29.7	-2.8	C_{18}		Ruminant adipose fat
KP-4	126	44	-26.5	-31.3	-4.8	C_{18}		Ruminant dairy fat
KP-5M	367, 380, 381	231	-27.7	-30.4	-2.7	C_{18}-C_{22}		Mixture, marine and ruminant fat
KP-5U	367, 380, 381	147	-27.3	-29.2	-1.9	C_{18}-C_{22}		Mixture, marine and ruminant fat
KP-6	548; SF 7097	180	-27.2	-31.8	-4.7	C_{18}-C_{20}	phytanic acid, pristanic acid	Mixture, marine and ruminant fat (dairy)
KP-7	582	230	-26.9	-31.5	-4.5	C_{18}		Ruminant dairy fat
KP-7 visible	582	1894				C_{18}		
KP-8	528	76	-25.8	-30.4	-4.6	C_{18}-C_{22}		Mixture, marine and ruminant fat (dairy)
KP-9		129	-27.7	-30.9	-3.2			Mixture, marine and ruminant fat
KP-10	533	127	-26.2	-31.7	-5.5	C_{18}-C_{22}	phytanic acid	Mixture, marine and ruminant fat (dairy)
KP-11	569	74	-26.6	-29.6	-4.8			Ruminant dairy fat
KP-12	316	48	-26.6	-28.9	-2.3			Ruminant adipose fat
KP-13	582	8						
KP-14	569	176	-27.6	-31.0	-3.4			Ruminant adipose fat
KP-15	316; SF 2047	188						
KP-16	618	34						
KP-17	534; SF 1920	0.6						
KP-18	422	20						
KP-19	367	157	-27.3	-31.2	-3.9	C_{18}		Ruminant dairy fat
KP-20	602	64				C_{18}-C_{22}		Marine fat contribution

pieces were removed with a chisel, and then carbonized residues and sherd fragments were crushed in a solvent-washed mortar and pestle. After the addition of an internal standard (10µg or 20µg *n*-tetratriacontane to the carbonized deposit or sherd fragment respectively), sherds or residues were solvent-extracted using 2 × 5 ml (carbonized residue) or 2 × 10ml (sherd fabric) $CHCl_3$/MeOH 2:1 v/v via sonication (20min.). Solvent was removed using a gentle stream of N_2 and aliquots of the total lipid extract (TLE) were filtered through a silica column and treated with 40µl *N,O*-bis (trimethylsilyl) trifluoroacetamide (BSTFA, 70°, 1h) prior to screening using high-temperature gas chromatography (HTGC). Aliquots from selected sherds were then hydrolysed (0.5M NaOH/MeOH; 70°, 1h) and methylated (100µl BF_3/MeOH; 75°, 1h) for the structural identification of components using GC/mass spectrometry (GC/MS) and highly sensitive detection of specific biomarkers using selected ion monitoring (GC/MS-SIM). The isotopic composition of individual fatty acids was determined using GC-combustion-isotope ratio MS (GC/C/IRMS). The $\delta^{13}C$ values were derived according to the following expression and are relative to the international standard vPDB: $\delta^{13}C$ ‰ = $((R_{sample} - R_{standard})/R_{standard}) \times 1000$ where R = $^{13}C/^{12}C$. The $\delta^{13}C$ values were corrected for the carbon atoms added during methylation using a mass balance equation.

23 Soil micromorphology

C. Ellis

23.1 Thin-section description

The 24 samples were assessed using a MEIJI ML9200 polarizing microscope following the principals of Bullock *et al.* (1985), FitzPatrick (1993) and Stoops (2003). A range of magnifications (40×–400×) and constant light sources (plane polarized light [PPL, cross-polars], circular polarized light [CPL] and oblique incident light [OIL]) were used in the analysis.

23.2 Summary of general characteristics

Discussion and interpretation of the micromorphology of the sampled deposits considered by phase can be found in the relevant chapters (see Chapters 3, 4, 6, 8, 9 and 10).

Generally the sampled occupation deposits have a shell-rich, windblown, medium-sized sand as their basis (Table 23.1). Those deposits dominated by windblown sand exhibit a range of microstructures, the type being a function of the source of the material and the mode of deposition and/or accumulation. Relatively undisturbed or 'clean' windblown sand has a single-grained microstructure.

The other common type of microstructure observed is an inter-grain microaggregate microstructure, where medium to fine sand-sized microaggregates of mostly ash residues mixed with silt-sized mineral material occur between the sand grains. This type of microstructure within the Cille Pheadair samples is thought to be the product of aeolian processes, where windblown sand is mixed with eroded midden material and/or the faecal pellets of soil biota.

Many of the sampled deposits exhibit elements of two or more microstructures. These complex microstructures tend to comprise a zone of single-grained microstructure, with zones of inter-grained microstructure and/or single-grained with zones of bridge-grained, and/or pellicular microstructure (thin coating of fine material on the mineral grains). The latter tends to indicate re-working of the deposit.

The windblown sand is well to perfectly sorted and comprises roughly 50%–70% rounded shell grains and 30%–50% rounded quartz and feldspar grains, with very few rock fragments of medium sand size (Table 23.2). The sand grains tend to exhibit some type of preferred orientation, either reflecting the direction of the wind and/or the surface of deposition. Changes in the velocity of the wind can lead to the formation of laminations, either defined by a slight change in grain size or, more commonly, by the presence or absence of fine material. Laminations can also be the product of the actions of man and/or animals.

The spatial relationship between the coarse material and the fine material is the related distribution; the two commonest types in the Cille Pheadair samples are the monic, as seen in pure windblown sand with no fine material, and the enaulic as seen in deposits with inter-grain microaggregates.

The main fuel utilized was sandy peat and/or turf. This occurs in the samples as sub-rounded to rounded clasts, within inter-grain microaggregates, as bridges of organo-mineral material between sand grains or as discrete bands of near pure ash. The most common ash deposits exhibit rubified (orange to red) fine material in oblique incident light (OIL) and a few silt-sized charcoal fragments. Sandy peat ash has frequent phytoliths and very few diatoms while the turf ash has very few phytoliths and diatoms. Where actual fragments of charred peat survive, this contains very sparse coarse mineral material and, in some cases, abundant phytoliths. The majority of the ash clasts comprise frequent fine–medium sand with red/orange fine material in OIL which is more typical of a turf ash than a peat ash.

Those deposits dominated by ash, as well as many of the inclusions of ash, are characterized by fine sand-sized quartz and feldspar mineral grains with no or very few shell grains. Shell is not destroyed by low-temperature fires; rather, the shell cracks and breaks up, as well as becoming a brownish grey (Courty *et al.* 1989); such shell fragments are seen in the lenses and clasts of wood ash. It therefore appears that the turf and sandy peat utilized as the main fuel on the farmstead were from a source where the underlying C horizon was dominated by quartz and

feldspar, presumably weathered gneiss or glacial till: the turf did not, therefore, come from the machair.

Wood was utilized as a fuel, but only rarely, probably reflecting its infrequent occurrence as driftwood on the beach. The wood ash is characterized by acicular calcite crystals which are pseudomorphs of organic matter, a mass of non-radial spherulites, lenses of micrite (fine-grained calcite) and occasional charcoal. The wood ash tends to contain sand-sized shell grains and fragments of shell, many of which show signs of having been burnt.

Apart from large quantities of ash, other anthropic indicators in the samples include fragments of bone, fragments of pottery and fragmented clasts of herbivore dung and possible omnivore coprolites. The bone is generally small in size, some is rounded as if it has been ingested, and other fragments are clearly burnt. Much of the smallest bone appears to be fine fish bones.

Small calcite spherulites with a radial arrangement of crystals are produced in the digestive tracts of herbivores (Canti 1997). These occur in very small quantities in many of the contexts and are likely to be an integral part of the sandy peat and/or turf, incorporated prior to its being cut and collected, rather than representing the deliberate use of dung as a fuel. In a couple of the contexts from House 500, however, it appears that dung or even soiled byre bedding could have been used as a fuel.

Many of the ash-dominated deposits exhibit a microlaminated fabric. The laminations generally have sharp boundaries because a new layer of ash was laid, dumped or swept on top of the underlying deposit without removing or destroying it. The survival of these often very delicate laminations demonstrates that the deposits were not physically disturbed between periods of accumulation.

Bioturbation is not extensive in any of the deposits. Most deposits contain very few calcite biospheroids which are a by-product of earthworms. A minority of the inter-grain microaggregates also appear to be the product of soil biota, *i.e.* faecal pellets, or at least organo-mineral material partially reworked by soil biota. These indicators of bioturbation might have been produced elsewhere, *i.e.* within a machair soil or within a midden heap, only later to be incorporated into a given deposit by aeolian processes. Limited *in situ* bioturbation is evident in those deposits with fauna passages and channels and very few fabric pedofeatures.

23.3 Technical descriptions

Sample 7553

This sample comprises context 621 in three units. This phase 1 context lay below the Norse-period occupation layers of the site.

Microstructure

The lowermost unit: a single-grained microstructure with simple packing voids; abundance 30%. Sharp and prominent boundary between the lower fill and the central fill *c.* 3mm Th, exhibiting an inter-grained microaggregate microstructure. Central fill: complex packing voids; abundance 30%. The boundary between the central and upper unit is sharp and prominent. The upper unit: a single-grained microstructure with simple packing voids; abundance 30%.

Fabric

All the units largely comprise well-sorted medium sand, with a weak horizontal-preferred orientation in the central and upper units. The lower and upper units exhibit a monic-related distribution, the central unit a single-spaced equal enaulic-related distribution. The fine material in the central unit is black (organics) and grey brown (micrite) in PPL, isotropic and crystallitic (respectively) in XPL, black (organics) or cream (micrite) in OIL. In the upper unit there are very few rounded clasts of medium sand-sized mineral grains (no shell) with few iron coatings; very few clasts of phosphatic-rich organic matter, with phytoliths; small clasts of central unit incorporated, probably by action of soil biota.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50%–70% in the lower unit, 50% in the central unit and 50%–70% in the upper. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few grains of feldspars are seriticized. Very few calcite biospheres in all three units. In the central unit there are frequent, large acicular calcite crystals, often inter-grown with micrite.

Basic organic component

Very few silt-sized charcoal fragments in the lower unit. Charcoal dominates the central unit; the charcoal is generally massive (no or few pores) and broken in grit and medium sand-sized pieces. Frequent micrite cement and acicular calcite crystals appear associated with organic matter. Few mycorrhizal sheaths of *Cenococcum geophilum*; very few small roundwood charcoal fragments. Very few bone fragments. In the upper unit there are very few charcoal fragments, very few thin bone fragments (probably fish) and very few fungal spores.

Pedofeatures

Very few channels. In the central unit some of the organic matter has been broken up by soil biota but much of this appears to have occurred before the accumulation of the deposit. In the upper deposit very few iron replacement of roots – fragmentary.

Sample MM6

This sample was taken from context 006, the walls of the outhouse south of the main longhouse in phase 8. In thin section two units are visible.

Table 23.1. Summary of characteristics of the micromorphological samples: microstructure, matrix and fabric

Sample	Context/ band	Microstructure			Matrix			Fabric				
			abundance of voids %	*boundary*	*matrix colours PPL*	*matrix colours OIL*	*matrix colours XPL*	*sorting*	*grain size*	*internal fabric*	*clasts/ lens*	*related distribution*
7553	lower	single grained (s.g.)	30	sharp, prominent				well (w.)	medium sand (m.s.)			monic (m.)
	central	intergrained microaggregate (i.m.)	30	sharp, prominent	black (bl.) grey brown (g.b.)	black (bl.) cream (c.).		w.	m.s.	horizontal		s.s.e. enaulic
	upper	s.g.	30				isotropic. (i.)	w.	m.s.	horizontal	*	m.
MM6	lower	s.g.	35	diffuse, distinct				perfectly (p.)	m.s.			m.
	upper	s.g.	35					p.	m.s.		*	m.
7493	320	s.g.	35	diffuse, distinct				p.	m.s.			m.
	317	s.g.	35					p.	m.s.			m.
MM12	370	complex	20					p.	m.s.		*	m.
MM15	371	s.g. + bridge grain (b.g.)	20-35					p.	m.s.	micro-laminated	*	m.
MM7	504	i.m.	15		yellow, dark brown (y.d.b.)	yellow, dark brown. (y.d.b).	i.		m.s.	horizontal	**	s.s.f. enaulic
MM10	504	complex	2-5/15-20		y.b.	y.d.b.	c. + i.	w.	m.s.		****	chitonic/ f. enaulic

Table 23.1. continued

Sample	Context/ band	Microstructure			Matrix			Fabric				
			abundance of voids %	*boundary*	*matrix colours PPL*	*matrix colours OIL*	*matrix colours XPL*	*sorting*	*grain size*	*internal fabric*	*clasts/ lens*	*related distribution*
MM8	504 lower	i.m.	10-15	sharp, prominent	y.d.b.	y. to b.	i.	moderately (m).	m.s.	micro-laminated		s.s.f. enaulic
	504 central	complex	10-15	sharp, prominent	y.b.	orange and yellow (o + y)	i.	m.	m.s.	micro-laminated		porphyric (p)
	504 upper	complex	20		bl. + b.	brown and black (b + bl)	i.	w.	m.s.			s.s.enualic
MM9	600	s.g.	40	diffuse, faint	bl.	o.	i.	w.	m.s.	horizontal	*	m.
	544	complex	30-40		bl.	y.d.b.	c. + i.	w.	m.s.		*	s.s.f. enaulic
7299	544-1	s.g.	20-40	sharp, prominent	bl.	bl. + y.	i.	w.	m.s.	micro-laminated	*	m.
	544-2	vughy	10	sharp, prominent	d.b.	o. + y.	c. + i.	w.	m.s.			p.
	544-3	i.m.	20-30	sharp, prominent	d.b.	o. + y.	i.	w.	m.s.	micro-laminated	**	f.enualic
	544-4	i.m.		sharp, prominent	bl.	o. + y.	i.	w.	m.s.	micro-laminated		d.s.enualic
	544-5	i.m.	20-30		d.b.	d.y.b.	i.	w.	m.s.	micro-laminated	***	f.enualic
7302	564-lower	i.m.	30	sharp, prominent	d.b.	y.b.	c. + i.	w.	m.s.		*	s.s.f. enaulic
	520-central	i.m.	10-15	sharp, prominent	bl.	bl. + y.	i.	w.	m.s.	horizontal	***	s.s.e. enaulic
	504-upper	i.m.	30		d.b. + bl.	b.+ y.b.	c. + i.	w.	m.s.		**	s.s.f. enaulic

Table 23.1. continued

Sample	Context/ band	Microstructure			Matrix			Fabric				
			abundance of voids %	*boundary*	*matrix colours PPL*	*matrix colours OIL*	*matrix colours XPL*	*sorting*	*grain size*	*internal fabric*	*clasts/ lens*	*related distribution*
7659	224	s.g	30-40	sharp, prominent				w.	m.s.	dipping	*	m.
	central	b.g.	30	sharp, prominent	dark reddish brown (d.r.b.)	b.	i.					gefuric (g.)
	225	s.g.	30-40					w.	m.s.	dipping	*	m.
7660	136	s.g.	40	sharp, prominent	b.	o.	i.	w.	m.s.	dipping	*	m.
	135	i.m.	20	sharp, prominent	d.b. + bl.	o.	c. + i.	w.	m.s.		*	s.s.f. enaulic
	133	i.m.	30		bl.	o.	i.	w.	m.s.	dipping	*	s.s.f. enaulic
MM11	lower	s.g.	40-50	sharp, prominent				w.	m.s.		*	m.
	central	i.m.	10-40	sharp, prominent	d.y.b.	o. + y.	c. + i.	w.	m.s. f.s.	horizontal	**	s.s.enualic
	upper	s.g.	40					w.	m.s.	horizontal	**	m.
MM5	lower	s.g.	40-50	sharp, distinct				w.	m.s.		**	m.
	central	i.m.	40-50	diffuse, faint	d.b.	o. + y. + b.	c. + i.	w.	m.s.			s.s.e.enaulic
	upper	s.g.	40-50					w.	m.s.		**	m.
MM1	lower	s.g.	30-40	diffuse, faint				w.	m.s.		**	m.
	central	i.m.	20-40	sharp, prominent	d.b.	o. + y.	c. + i.	w.	m.s.	horizontal	**	s.s.f. enaulic
	upper	i.m.	20		y.d.b. bl.	o. b.	i.	poorly (po.)	m.s.			s.s.enualic

Table 23.1. continued

Sample	Context/ band	Microstructure			Matrix			Fabric				
			abundance of voids %	*boundary*	*matrix colours PPL*	*matrix colours OIL*	*matrix colours XPL*	*sorting*	*grain size*	*internal fabric*	*clasts/ lens*	*related distribution*
MM2	lower	s.g.	40	diffuse, faint				w.	m.s.	horizontal	*	m.
	upper	i.m.	20-30		db.	o. b.	c. + i.	w.	m.s.			s.s.e.enaulic
MM13	206	i.m.	10-15	diffuse, faint	y. b.	y. b.		w.	m.s.	horizontal	*	s.s.e. enaulic
	204	i.m.	10-15		bl. d.b.	y.b.	i.	w.	m.s.	horizontal		s.s.f. enaulic
MM17	205	i.m.	5-20	clear, distinct	d.b.	o. y.	i.	m.	m.s.	micro-laminated	**	c.f.enaulic
	206	i.m.	5-10		d.b.	o. y.	i.	m.	m.s.	micro-laminated	***	c.f.enaulic
MM14	214	complex	40	diffuse, faint	d.b.	y.b.	i.	w.	m.s. c.s.		*	s.s.f. enaulic
	205	i.m.	35	diffuse, faint	d.b.	y.b.	i.	w.	m.s.			s.s.f. enaulic
	206	s.g.	40	diffuse, faint				w.	m.s.		**	m.
	204	complex	20-35	diffuse, faint	d.b.	y.b.	i.	m.	m.s.		*	s.s.f. enaulic
MM16	lower	s.g.	35	diffuse, faint				w.	m.s.		*	m.
	upper	complex	40		d.b.	y.b.	i.	w.	m.s.		*	s.s.f. enaulic
6371	1	s.g.	30	sharp, prominent				w.	m.s.			m.
	2	i.m.	10	sharp, prominent	d.r.b.	o.+ y.	i.	w.	m.s.			s.s.f. enaulic
	3	complex	20	sharp, prominent	d.r.b.	o.+ y.	i.	w.	m.s.			s.s.f. enaulic
	4	complex	2-5	sharp, prominent	d.r.b.	o.+ y.	i.	w.	m.s.			p.
	5	s.g.	30					w.	m.s.			m.

Table 23.1. continued

Sample	Context/ band	Microstructure			Matrix			Fabric				
			abundance of voids %	*boundary*	*matrix colours PPL*	*matrix colours OIL*	*matrix colours XPL*	*sorting*	*grain size*	*internal fabric*	*clasts/ lens*	*related distribution*
MM3	lower	complex	40-50	diffuse, faint	d.b. + bl.	o.	i.	w.	m.s.		*	s.s.f. enaulic
	central	s.g.	30	diffuse, faint				w.	m.s.			m.
	upper	i.m.	30		d.b. + bl.	o.	i.	w.	m.s.	horizontal		s.s.f. enaulic
MM4	109	complex	30	sharp, prominent	d.r.b. + bl.	o. + y.	i.	w.	m.s.	horizontal	*	c.f.enaulic
	108/101	i.m.	15-20	sharp, prominent	d.r.b. + bl.	bl.	c. + i.	w.	m.s.	horizontal	*	c.f.enaulic
	107	i.m.	10-15	diffuse, faint	d.r.b. + bl.	o. + y.	i.	w.	m.s.	horizontal		c.f.enaulic
	106	i.m.	30		d.r.b. + bl.	o. + y.	i.	w.	m.s.	horizontal		c.f.enaulic
Key	*very few*	*	*few*	**	*frequent*	***	*common*	****	*dominant*	*****	*very dominant*	******

Microstructure

Single grain microstructure with simple packing voids; abundance 35%. Point contact between sand grains. Boundary between lower and upper unit diffuse and distinct.

Fabric

Both units are perfectly sorted medium sand, dominated by a monic-related distribution. Upper unit has very few rounded clasts with yellowish brown matrix, with charcoal fragments and quartz grains (up to 2mm). Clast of re-deposited ash occurs near top of slide. Clast (*c.* 2mm) with quartz, shell and very few feldspar grains. Clast with yellow fine material (PPL and OIL), mineral grains, amorphous organic matter and fragment of bone.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 70%–75%, with 20% quartz grains and 10% feldspars (many seriticized). Very few fine sand-sized pyroxenes. Very few calcite biospheres. Very few larger shell fragments (gastropods). Very few sparite-dominated grains. Very few acid igneous rock fragments (3mm).

Basic organic component

Very few minute fragments of charcoal, associated with Fe staining (bright orange in OIL). Very few soil fungi, very few roots.

Pedofeatures

Very few rounded fabric pedofeatures (2mm). Upper unit has very few fibrous, dark red/orange, Fe gels replacing roots cutting through the sediment (dark reddish brown in OIL). Rare clasts of Fe gels (dark reddish brown to bright orange in OIL), probable pseudomorphs of organic matter.

Sample 7493

This sample comprises contexts 317 and 320. Phase 3 midden layer 317 ran through the northeastern and eastern middens, and phase 4 layer 320 lay in the northeastern midden only.

Microstructure

Single grain microstructure, although the upper unit exhibits a weak bridge grain microstructure in places. Simple packing voids; abundance 35%. Point contact between sand grains. The straight boundary between the upper and lower unit is diffuse and distinct.

Fabric

Perfectly sorted medium sand, dominated by a monic-related distribution.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 70%–75%, with 15% quartz grains and 15% feldspars (many seriticized). Very few fine sand-sized pyroxenes. Very few calcite biospheres. Very few sparite-dominated grains. Very few acid metamorphic rock fragments (3mm). Very few fragmentary biogenic silica.

Basic organic component

Organic component occurs predominantly, but not exclusively, in the upper unit. Very few minute fragments of charcoal set in fine matrix (yellowish orange in OIL); fine material occurs as irregular thin coatings to mineral grains or irregular small clasts (500µm). Very few fragments of bone (most *c.* 1–2mm, one large fragment 7mm), mostly concentrated in the upper portion of the slide, although occasional fragments in the lower unit.

Pedofeatures

Very few calcium oxalate pseudomorphs. Very few tabular, broken clasts of Fe gels (dark reddish brown in OIL), probable pseudomorphs of organic matter. Very few rounded fabric pedofeatures (1mm). Organic ashy material also occurs as a few small welded microaggregates/faecal pellets.

Sample 6876 MM12

This sample was taken from context 370, the earliest floor layer (phase 4) in Structure 353, the north room to House 500.

Microstructure

Complex microstructure with elements of single grain, pellicular, bridge grain and inter-grain microaggregate. Simple packing voids; abundance 20%. Point contact between sand grains.

Matrix

Perfectly sorted medium sand, dominated by a monic-related distribution, with some chitonic. Very few sub-rounded clasts of ash with phosphate staining; very few, fragmentary biogenic silica.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 40%–50%, with 25% quartz grains and 25% feldspars (many seriticized). Very few fine sand-sized pyroxenes. Very few calcite biospheres. Very few sparite-dominated grains.

Basic organic component

Few amorphous organics. Very few cellular fragments of charcoal (up to 1mm). Very few minute fragments of charcoal set in fine dark brown to black matrix (brown in OIL) comprising amorphous organic matter; fine material

Table 23.2. Summary of characteristics of the micromorphological samples: mineral composition, organic composition and pedofeatures

Sample	Context/band	Mineral composition						Organic composition								Pedofeatures							
		Shell fragments %	*Rock fragments %*	*Biogenic silica/phytoliths*	*Diatoms*	*Calcite spherulites*	*Calcium biospheres*	*Pottery*	*Amorphous organic matter*	*Coarse or dense charcoal*	*Silt-sized charcoal*	*Roots*	*Yellow amorphous organics*	*Sclerotia/mycorrhizal sheaths/ fungal spores*	*Bone*	*Matrix pedofeautres*	*Fabric pedofeatures/clasts/ lens*	*Faecal pellets*	*Channels/passages*	*Iron oxide pseudomorphs*	*Calcium oxlate*	*Acicular calcite*	*Micritic ash/clasts and lens*
7553	lower	50-70	2				*				*		*						*				
	central	50	2			*	*			*****			*	**	*			*	*			***	***
	upper	50-70	2				*			*				*	*	*			*	*			
MM6	lower	70-75	2																	*			
	upper	70-75	2								*			*		*	*			*			
7493	320	70-75	2												*		*						
	317	70-75	2	*							*				*		*	**		*			
MM12	370	40-50	2	*			*		**	*	*		*	**	*				*	*	*		
MM15	371	70-75	2				*			*	*				*		**	*	**		*		*
MM7	504	20	2-5	***		**	*		****	**	**			*	**			****	***	*	*		*
MM10	504	2/10	2-5	***		*	*			***	***	*	***	*	*			***	***				
MM8	504 lower	>2	2	***	*					***	***			*	*			*					
	504 central	>2	2	****	*					**			***					*					

Table 23.2. continued

	504 upper	10	2	*	*		*			*****					*			*					
MM9	600	50-70	2				**			*	***			*	*		**	*	***				
	544	50	2				**			*	***				*		*	*	***	*			*
7299	544 -1	50	2				*			***				*	**				**			**	
	544- 2	10	2	***		**				**	**				*							*	
	544- 3	10-30	2			*	*			**	***				**			***	**			*	*
	544- 4	5-20	2	****					**	*****	****		***		*				**				*
	544- 5	5-40	2			**	*			**	***		****		**				**			*	
7302	564 lower	10-30	2			**	*			*	**				*			****	***	*		*	
	520 central	5.10	2	*						*****					*								
	504 upper	30-50	2			*				*	**			*	*			**	***			*	
7659	224	50	2	*		*	*							*	*			*	***	*			
	central	>2	2	****						*****	*									*			
	225	50	2				*			*					*				*				
7660	136	50-70	2	*	*	*	*			*	***			*	*			****	***				
	135	30-50	2	*		*	*			**				*	**			****	****				
	133	50	2			*				*				*	*			***	***				
MM11	lower	40-50	2			*	*			*													
	central	5	2	**		*				**	**				*			**	**	*			
	upper	40-50	2				*			*									***				
MM5	lower	50-70	2			*	*								*			**	**				

Table 23.2. continued

	central	10-15	2	**		*	*			**	***				*			***	**				
	upper	50-70	2			*	*								*			**	**				
MM1	lower	70	2	*		*	*			*	**				*			**	**				*
	central	30	2			*	*			*	**				*			**	**				
	upper	50	30	****						****	**				*			***	**				
MM2	lower	50	5				*	*		*					*		**	**				**	*
	upper	30-40	2			*	*			*	**				*			****				***	*
MM13	206	5	2	***	*	*	*			**					*		**	****	*				
	204	10	2	**		*	*			**	****				*		**	****	*				
MM17	205	2-5	2	*	*	*	*			**	***	*		*	*			****	*				
	206	2-5	2	*	*	*				***	***	*		*	*			****	*				*
MM14	214	30-50	2				*			**	***				*			**	*				
	205	30-50	2	*	*					**	***				*			**	*				
	206	30-50	2			*				**	***			*	*			*	*				
	204	30-50	2	*			*			**	***				*			**	*				
MM16	lower	50	2			*				**	***				*				*				
	upper	30	2			*	*			**	***				*				*				
6371	1	50-70	2			*	*			*			*					*					
	2	30-40	2	*						*	**		*					***					
	3	50	2	*						*	**		*					***					
	4	>2	2	****	*	*				*	**	*		*				****					*
	5	50-70	2															*					

Table 23.2. continued

MM3	lower	50	2	**	*		*			*	**			*	*			****	***			***	
	central	50-70	2				*								*			*					
	upper	40	2	**		*	*				**			*	*			****					
MM4	109	50-70	2				*			*	**				*			****					*
	108/101	20-30	2				*			****	*****		*	*	*			****				*	***
	107	50	2				*			*	**				*		*	****					
	106	50-70	2				*				**				*			****					
Key	*very few*	*	*few*	**	*frequent*		***		*common*	****		*dominant*		*****				*very dominant*				******	

occurs as irregular thin coatings to mineral grains or irregular small clasts (20–500µm). Frequent single-celled, rounded organic matter (fungi). Very few sclerotia near top of slide. One large fragment of charred, woody amorphous organic matter (1.5mm) adjacent to clast comprising fragments of charcoal and stained by phosphate. Very few fragments of bone. Probable linear fish bones near top of slide.

Pedofeatures

Few linear, partially infilled channels; infill mainly stacked quartz and feldspar grains with soil biota/earthworm channels. Very few calcium oxalate pesudomorphs. Very few tabular, broken clasts of Fe gels (dark reddish brown in OIL), probable pseudomorphs of organic matter.

Sample 6877 MM15

This sample was taken from context 371 in Structure 353, belonging to phase 4 and identified as an ephemeral hearth.

Microstructure

Discontinuous microlaminations: at least eight episodes of deposition apparent. Sharp and prominent boundaries dipping 15°, thinnest *c.* 1mm; large bands comprise 'clean' sand with very little inter-grain fine material. Single grain microstructure, minor elements with bridge grain microstructure. Within the laminations there is a weakly developed preferred orientation of the elongated mineral grains with the direction of dip. Simple packing voids; abundance 20% (ashy bands) to 35% (clean sand). Point contact between sand grains.

Fabric

Perfectly sorted medium sand, dominated by a monic-related distribution. Microlaminations with lenses comprising partially fused microaggregates of micrite mixed with very few minute fragments of charcoal (silt-sized) and Fe gels (orange in OIL); ash residue. Other ash residues are orange in OIL, contain minute fragments of charcoal and occur as thin coatings to mineral grains and/or bridges of fine material between grains. Odd clusters of mineral grains with very few shell fragments; these occur in ashy laminations and clusters of mostly shell fragments occur in 'clean' sand.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 70%–75%, with 15% quartz grains and 15% feldspars (many sericitized). Very few fine sand-sized pyroxenes. Very few calcite biospheres. Very few sparite-dominated grains. Few grains of hematite within ash material. Very few igneous rock fragments.

Basic organic component
Very few minute fragments of charcoal set in fine matrix (yellowish orange in OIL); fine material occurs as irregular thin coatings to mineral grains or irregular small clasts (500µm). Very few larger, linear, cellular fragments of charcoal (1mm). Very few fragments of bone (1mm); one piece burnt.

Pedofeatures
Few fabric pedofeatures. Few ill-defined fauna channels. Very few calcium oxalate pseudomorphs.

Sample 7048 MM7
This sample was taken from context 504, a phase 4 floor layer in House 500 Stage I.

Microstructure
Inter-grain microaggregate microstructure dominates, although much fused forming a bridge grain microstructure. Occasional examples of pellicular microstructure. Complex packing voids; abundance 15% (zones of 10% and zones of 20%).

Fabric
Fine sand. Preferred, near-horizontal orientation of larger inclusions. Dominated by a single-spaced fine enaulic-related distribution. Fine material is yellowish brown to dark yellowish brown in PPL and OIL (amorphous organic matter, goethite and other Fe gels) and isotropic in XPL (undifferentiated b-fabric). Less than 5% of the fine material shows a weak anisotropy (weakly developed calcitic crystallitic b-fabric). Fragmented clasts (3mm) comprising rounded fragments of bone, phosphate, mineral grains and few silt-sized charcoal fragments. Few irregular spherical clasts of mineral grains set in fine yellow material, up to 1mm in diameter, are possible omnivore excrement.

Basic mineral component and rock fragments
Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 20%, with 35%–40% quartz grains and 35% feldspars (many seriticized) and 2%–5% rock fragments. Very few fine sand-sized pyroxenes. Very few calcite biospheres. Very few sparite-dominated grains. Discontinuous band of micrite with internal micrite ovals, occasional fragments of charcoal, very few phytoliths, very few to frequent mineral grains and very few shell grains (uneven distribution) and granular appearance; coats and is internal to bone fragment. Few sparite biospheres and biocones (?). Frequent fragmentary biogenic silica (phytoliths) in the yellowish brown fine material and calcite spherulites.

Basic organic component
Amorphous organic matter dominates the fine material. Very few to few bone fragments, the largest oriented about the horizontal (5mm in length); some affected by bioturbation. Few fragments charcoal, *c.* 500µm to 1mm, some within fabric pedofeatures incorporating mineral grains. Few silt-sized fragments of charcoal within the fine material. Very few organic single cells. Very few calcite spherulites mixed with fine material with phytoliths and charcoal.

Pedofeatures
Inter-grain microaggregates, dense, silt to medium sand-sized. Few to frequent partially infilled channels. Small linear zones where fine material appears concentrated, result of activities of soil fauna. Very few calcium oxalate pseudomorphs, very few roots, replaced by sequioxides.

Sample 7049 MM10
This sample was taken from context 504, a phase 4 floor layer in House 500 Stage I.

Microstructure
Complex microstructure with juxtaposition of different materials. Concentration of dense grass and wood ash with sand exhibits vughy microstructure. Abundance of voids 2%–5%. Surrounding material comprises inter-grain microaggregate microstructure. Complex packing voids; abundance 15%–20%.

Fabric
Common clasts. The grass and wood ash zone exhibits a chitonic-related distribution. It is a well-sorted medium sand. The fine material is yellow brown in PPL and OIL and weakly crystallitic in XPL. Other clasts include linear clasts of sandy peat (bright orange in OIL) with phytoliths. The surrounding material, a well-sorted medium sand, exhibits a fine enaulic-related distribution. The fine material is dark brown to black in PPL, isotropic in XPL and brown in OIL. Other clasts include charred silty peat with phytoliths, and clasts where iron oxide mask much of the organic matter (again rich in phytoliths).

Basic mineral component and rock fragments
Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 2% in the zone dominated by peat ash and 10% in the surrounding material; 2%–5% rock fragments (many feldspars seriticized). The peat ash contains common fragmentary phytoliths. In places wood ash with weak micrite cement and some of its edges stained by iron oxide. Zones where ash is silt-rich, and also contains common phytoliths; these occur in both units. Very few calcite biospheres, one in burnt sandy peat clast. Bioturbated clasts rich in phytoliths and where organic matter is partially replaced by iron oxide. Very few calcite spherulites in clast of organic matter rich in phosphate.

Basic organic component

Few silt-sized charcoal fragments in grass sand wood clast. Frequent silt-sized charcoal fragments in surrounding material; much concentrated in irregular and disrupted clasts. Few to frequent medium sand-sized charcoal fragments. Very few bone fragments. Very few mycorrhizal sheaths of *Cenococcum geophilum,* very few roots.

Pedofeatures

The ash and organics in the surrounding material have been reworked by soil biota, forming inter-grain microaggregates, dense, silt- to medium sand-sized. Few to frequent channels, some in surrounding unit partially infilled with faecal pellets. One channel infilled with shell fragments and fine material which is largely replaced by goethite.

Sample 7050 MM8

This sample was taken from context 504, a phase 4 floor layer in House 500 Stage I. This sample comprises three distinct layers.

Microstructure

The lowermost unit comprises a dense inter-grain microaggregate microstructure. Complex packing voids; abundance 10%–15%. The boundary into the central unit is sharp and prominent. The central unit comprises a complex microstructure, with some dense inter-grain microaggregates mixed with a vughy microstructure. Complex packing voids; abundance 10%–15%. The boundary into the upper unit is sharp and prominent. The upper unit comprises a complex microstructure with elements of inter-grain microaggregate microstructure, bridge grain and also pellicular grain microstructure. Complex packing voids; abundance 20%.

Fabric

The lowermost unit is a microlaminated medium sand (charcoal- and phosphate-rich); charcoal-rich with much replacement by hematite; charcoal and amorphous organic matter. It is dominated by a single-spaced fine enaulic-related distribution. Fine material is yellowish brown to black in PPL, isotropic in XPL and yellow to pale brown in OIL. The central unit is a microlaminated medium sand with a fine silt matrix. It is dominated by a porphyric-related distribution. Fine material is yellowish brown in PPL, isotropic in XPL and orange/yellow in OIL. The upper unit is well-sorted medium sand. It is dominated by a single-spaced enaulic-related distribution. The fine material is black in PPL, isotropic in XPL and brown to black in OIL.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. The lowermost unit has less than 2% shell fragments (one large fragment of 6mm length), the central unit none except for two large thin fragments (each 15mm long and roughly horizontal) and the upper unit locally variable but *c.* 10%. Remainder of the mineral material dominated by quartz and feldspars, with less than 2% rock fragments (many of the feldspars seriticized). Single calcite biosphere in upper unit. Very few sparite-rich grains also in upper unit. Lower unit frequent phytoliths and very few diatoms. Central unit common fragmentary biogenic silica including phytoliths and diatoms; where most concentrated this material has greyish brown colour. Upper unit few fragmentary phytoliths and very few diatoms.

Basic organic component

In the lowermost unit peat and charred organic matter, overlain by grass ash, overlain by charcoal and amorphous organic matter; one lamination frequent silt-sized charcoal and medium charcoal fragments, few fragmentary phytoliths; next band shows frequent charcoal that has largely been replaced by hematite, very few fragmentary biogenic silica; next band frequent charcoal (linear, roundwood *etc*.), charcoal and amorphous organic matter, some phosphate. Very few mycorrhizal sheaths of *Cenococcum geophilum*. Central unit very few bone fragments (sand-sized and rounded) in upper unit only. Few fragments of charcoal. Upper unit dominated by dense charcoal and charred amorphous organic matter. Very few burnt sclerotia, very few bone fragments.

Pedofeatures

Few faecal pellets.

Sample MM9

This sample comprises context 600, a phase 2 levelling layer, and context 544, a phase 4 floor layer in House 500 Stage I.

Microstructure

The lowermost unit (600) is dominated by a single grain microstructure. Simple packing voids; abundance 40%. The boundary between 600 and 544 is diffuse and faint. The uppermost unit (544) is dominated by weakly developed inter-grain microaggregate microstructure. However, there are frequent zones dominated by single grain microstructure, especially towards the base of the slide. Complex packing voids dominate. Abundance of voids 30%–40%.

Fabric

Context 600 is a well-sorted medium sand with weak near-horizontal orientation of larger mineral grains, and exhibits a medium monic-related distribution. Very few lenses (up to 5mm) of ash with fine sand-sized mineral grains (no shell); one with common fragmentary biogenic silica, another with phosphate. Where present the fine material is black in PPL, isotropic in XPL and orange in OIL. Context 544 is a well-sorted medium sand and exhibits a single-spaced

fine enaulic-related distribution. The fine material is black in PPL, very weakly crystallitic in XPL and dark brown to dark yellow in OIL. Very few clasts of turf ash. Very few clasts of ash with weak micrite cement.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50%–70% in 600 and 50% in 544. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments; one rounded igneous rock fragment 5mm in 544. Few of the feldspars are seriticized. Few calcite biospheres and very few medium sand-sized grains of sparite in 600 and 544. In 544 very few rounded clasts of yellow material (phosphatic ash) with common fragmentary phytoliths.

Basic organic component

Where present the fine ash material contains few to frequent silt-sized charcoal. Very few medium sand-sized and larger (5mm) charcoal fragments in 600. Very few bone fragments (largest 5mm), some fish. Very few sclerotia. In 544 very few burnt bone fragments, very few sclerotia, very few large (3mm) cellular charcoal fragments.

Pedofeatures

In 600 very few inter-grain microaggregates (faecal pellets) comprising remnants of ash. Few to frequent channels in 600 and 544. In 544 very few inter-grain microaggregates, very few iron pseudomorphs of roots.

Sample 7299

This sample was taken from context 544, a phase 4 floor layer in House 500 Stage I. Five distinct bands are visible, with bands 1, 3, 4, and 5 containing microlaminations.

Microstructure

The lowermost band (1) is dominated by a single grain microstructure. Simple packing voids; abundance locally variable between 20%–40%. The boundary between (1) and (2) is sharp and prominent. (2) is dominated by a vughy microstructure with polyconcave voids (channels/vughs). Abundance of voids 10%. The boundary between (2) and (3) is sharp and prominent. (3) is dominated by a weakly developed inter-grain microaggregate microstructure, interrupted by discontinuous lamina with a dense vughy microstructure. Complex packing voids; abundance 20%–30%. The boundary between (3) and (4) is sharp and prominent. (4) comprises at least three thin layers of burnt organic matter. The lowermost is dominated by charcoal and mineral grains, and exhibits an inter-grain microaggregate microstructure; the next two are dominated by organic matter separated by a thin, discontinuous layer of medium quartz/feldspar sand. The boundary between (4) and (5) is sharp and prominent. (5) is dominated by an inter-grain microaggregate microstructure; this becomes less well defined towards the top of the slide and there are frequent discontinuous lenses of fine material (ash). Complex packing voids; abundance 20%–30%. Horizontal preferred orientation of many of the elongated mineral grains, shell fragments and bone fragments.

Fabric

Fabric (1) is a well-sorted medium sand with weak near-horizontal orientation of larger mineral grains, and exhibits a medium monic-related distribution. Microlaminations of charcoal and lenses of biogenic silica ash. Where present the fine material is black in PPL, isotropic in XPL and black or yellowish brown in OIL. Very few lenses of ash which are orange in OIL. (2) is a well-sorted medium sand and exhibits a single porphyric-related distribution. The fine material is dark brown in PPL, very weakly crystallitic in XPL and yellow with some orange in OIL. (3) is a well-sorted medium sand and exhibits a fine enaulic-related distribution. The fine material within the inter-grain microaggregates is dark brown in PPL, isotropic in XPL and brownish yellow to orange in OIL. (4) the lowermost unit, is a well-sorted sand and exhibits a double-spaced enaulic-related distribution. The fine material is black in PPL, isotropic in XPL and orange/yellow in OIL. The overlying organic layer is yellow in PPL and OIL. The uppermost organic layer is black in PPL and OIL, but with some dark yellow in OIL. (5) is a well-sorted medium sand with a horizontal-preferred orientation of the elongated mineral grains, and exhibits a single-spaced fine enaulic-related distribution. The fine material is generally dark brown in PPL, isotropic in XPL and dark yellowish brown in OIL with occasional lenses exhibiting orange.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50% in (1), 10% in (2), 10%–30% in (3), between 5%–20% in (4) and locally variable in (5) between 5%–40%. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few of the feldspars are seriticized. Very few biospheres in (1), (3) and (5). Few acicular calcite in (1), very few in (2), (3) and (5) (often occurring in lenses and some contain phytoliths). Very few spherulites of calcite in (2), (3) and (5). Very few hematite grains in ash material (2). Unit (2) has frequent fragmentary biogenic silica.

Basic organic component

(1) Layer of charcoal, much cellular plant matter. Few fragments of bone, appear associated with charcoal. Very few fungal spores. (2) Few silt-sized charcoal fragments in fine material. Few medium sand-sized charcoal fragments. Very few bone fragments. (3) Frequent silt-sized charcoal in fine material. Few larger charcoal fragments. Few bone fragments. Very few clasts of charcoal associated with micrite cement. (4) Lower layer dominated by organic matter, dense charcoal, broken up into microaggregates, common phytoliths in associated clasts; central yellow

layer dominated by yellow amorphous organic matter and silt-sized, fragmentary organic matter (not burnt in centre but upper and lower edges slightly charred) and in a rough linear arrangement; upper layer charcoal and ash, some small roundwood (woody plant material), peaty with phytoliths. Very few fragments of burnt bone in the charcoal-rich layers (not in central layer). (5) Fine material contains silt-sized charcoal fragments. Few medium sand-sized and larger charcoal fragments. Linear lenses of burnt silty peat ash. Few burnt bone fragments.

Pedofeatures

In (1) acicular crystals occasional, associated with micrite cement. Micrite cement in (4) within voids of charcoal. Few channels in (1). Few to frequent inter-grain microaggregates (faecal pellets) comprising remnants of ash in (3). Few channels in (3), (4) and (5).

Sample 7302

This sample comprises three contexts 526, 520 and 504, all floor deposits from House 500 Stage I and its entrance passage in phase 4. Three distinct layers are visible.

Microstructure

The lowermost (526) is dominated by a weakly developed inter-grain microaggregate microstructure. Complex packing voids; abundance 30%. The boundary between 526 and 520 is sharp and prominent. Context 520 is also dominated by an inter-grain microaggregate microstructure, with lenses of dense, fine ash. Complex packing voids; abundance 10%–15%. Weak horizontal-preferred orientation of much of the charcoal. The boundary between 520 and 504 is sharp and prominent. Context 504 is dominated by a weakly developed inter-grain microaggregate microstructure. Complex packing voids; abundance 30%.

Fabric

Context 564 is a well-sorted medium sand and exhibits a single-spaced fine enaulic-related distribution. The fine material within the inter-grain microaggregates is dark brown in PPL, isotropic to weakly crystallitic in XPL and brownish yellow in OIL. Context 520 is a well-sorted sand and exhibits a single-spaced, equal enaulic-related distribution. The fine material is black in PPL, isotropic in XPL and black with fine yellow material in OIL. Context 504 is a well-sorted medium sand and exhibits a single-spaced fine enaulic-related distribution. The fine material within the inter-grain microaggregates is dark brown to black in PPL, isotropic to weakly crystallitic in XPL and brown to yellowish brown in OIL. Few lenses of micrite-cemented sand/ash.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Between 10%–30% shell fragments in 546, 5%–10% in 520 and 30%–50% in 504. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few of the feldspars are seriticized. Very few biospheres in 564. Few spherulites of calcite in 564 and very few in 504. Very few phytoliths in 520. Few acicular calcite in 564 and 504.

Basic organic component

Context 564: very few fragments of burnt bone, lens of phosphate-rich ash with burnt bone, few silt-sized charcoal fragments in fine material, very few large charcoal fragments (1 5mm) associated with phosphate, others contain mineral grains. Context 520: dominated by charred plant material, very few rounded sand-sized bone fragments, very few bone fragments (fish). Context 504: few silt-sized charcoal fragments in fine material, very few larger charcoal fragments (one roundwood), very few bone fragments, very few fungal spores, very few mycorrhizal sheaths of *Cenococcum geophilum*.

Pedofeatures

Context 564: very few Fe gels, iron oxide replacement of organic matter, roots, frequent channels, common faecal pellets. Context 504: frequent channels, few faecal pellets.

Sample 7659

This sample comprises contexts 224 and 225, phase 4 construction deposits.

Microstructure

Context 224 exhibits a single-grained microstructure. Simple packing voids; abundance 30%–40%. The boundary into a thin band is sharp and prominent. The central band (2mm Th) has a bridge grained microstructure. Complex packing voids; abundance 30%. The boundary between the central band and 225 is sharp and prominent. Context 225 exhibits a single-grained microstructure. Simple packing voids; abundance 30%–40%.

Fabric

Contexts 224 and 225 are well-sorted medium sands with many of the elongated shell fragments dipping in both directions between 15° and 60°. Both units exhibit a medium monic-related distribution. The central band exhibits a gefuric-related distribution. The fine material is dark reddish brown in PPL, isotropic in XPL and brown in OIL. Two clasts of charred sandy peat.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50% shell fragments in 224 and 225 and < 2% in the central band. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few of the feldspars are seriticized. Very few calcite biospheres and medium grains of sparite in 224 and 225. Very few

calcite spherulites in 224. Common fragmentary biogenic silica in central band. Context 225 has very few medium charcoal fragments, very few fragments of bone, one fragment of fish.

Basic organic component

Single lens (0.5mm) of herbivore dung in 224 with calcite spherulites, fragmentary phytoliths and fungal hyphae. Broken root replaced by iron oxide with phosphatic-rich interior. Very few fragments (medium sand and grit-sized) of dense charcoal. Very few fragments of bone. Central band comprises charred, linear, amorphous organic matter, very few silt-sized charcoal fragments, and very few (fish?) bone fragments.

Pedofeatures

Context 224: very few inter-grain microaggregates (faecal pellets), frequent channels, very few of which contain faecal pellets. Context 225: few channels. Some iron accumulation around organic matter in central band.

Sample 7660

This sample comprises contexts 136, 135 and 133, midden layers from the southeastern midden in phase 4. Three dipping units are visible.

Microstructure

The lowermost unit (136) is dominated by single-grained microstructure. However, there are frequent partially infilled channels and voids with medium sand and fine organic mineral silt inter-grain microaggregates. Simple packing voids dominate; abundance 40%. The boundary between 136 and 135 is sharp and prominent; it dips at *c.* 25°. Context 135 has an inter-grain microaggregate microstructure. Complex packing voids; abundance 20%. The boundary between 135 and 133 is sharp and prominent. Context 135 exhibits a weakly developed inter-grain microaggregate microstructure. Complex packing voids; abundance 30%.

Fabric

Context 136 is a well-sorted medium sand with weak near-horizontal orientation of larger mineral grains, and exhibits a medium monic-related distribution. Very few rounded lenses of peat/turf ash with fine sand-sized mineral grains. Within this clast is a patch of near pure biogenic silica including diatoms. Where present the fine material is black in PPL, isotropic in XPL and orange in OIL. Context 135 is a well-sorted medium sand and exhibits a single-spaced fine enaulic-related distribution. The fine material is dark brown to black in PPL, isotropic to very weakly crystallitic in XPL and orange in OIL. Very few clasts of peat ash. In 135 clasts of yellow (phosphatic ash) common fragmentary phytoliths. Context 133 is a well-sorted medium sand and exhibits a single-spaced fine enaulic-related distribution. Many of the elongated mineral grains exhibit a preferred orientation, dipping at *c.* 25°. The fine material comprises different materials and is black in PPL, isotropic in XPL and orange in OIL. Very few clasts of wood ash. Very few clasts of peat/turf ash (red in OIL).

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50%–70% in 136, 30%–50% in 135 and 50% in 133. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few of the feldspars are seriticized. Few grains of hematite in ash. Very few biospheres and very few medium sand-sized grains of sparite in 135 and 136. Very few calcite spherulites in 136, 135 and 133.

Basic organic component

Where present the fine ash material contains few to frequent silt-sized charcoal. Very few medium sand-sized charcoal fragments in 136. Very few bone fragments (some burnt), very few mycorrhizal sheaths of *Cenococcum geophilum*, very few sclerotia. In 135 few medium sand-sized charcoal fragments and very few larger fragments (up to 2mm). Very few fish bones, very few rounded sand-sized bone fragments, few rounded burnt bone fragments. Possible fragmentary burnt coprolite contains bone fragments (burnt and unburnt, including fish), phosphatic material, charcoal. Very few mycorrhizal sheaths of *Cenococcum geophilum*, very few sclerotia. In 133 very few bone fragments, very few fragments of medium sand-sized charcoal, very few mycorrhizal sheaths of *Cenococcum geophilum.*

Pedofeatures

In 136 few inter-grain microaggregates (faecal pellets) comprising remnants of ash. Few to frequent channels in 136 and 133. Very few iron pseudomorphs of roots. In 135 common channels. Common inter-grain microaggregates in 136 and 135 and frequent in 133.

Sample 6924 MM11

This sample comprises contexts 380, an upper friable brown sand, and 382, a lower dark brown friable sand, from Shed 406 in phase 6, both possibly being floors. Three bands of material are visible in thin section.

Microstructure

The lowermost band exhibits a single-grained microstructure. Simple packing voids; abundance 40%–50%. A single irregular lens occurs within this, comprising dense inter-grain microaggregate microstructure. Complex packing voids; abundance 20%. The boundary between the lowermost and central bands is sharp and prominent and near-horizontal. The central band has a dense inter-grain microaggregate microstructure. Complex packing voids; abundance locally variable 10%–40%. The majority of the

mineral grains exhibit a preferred horizontal orientation. Some internal microlaminations. The boundary between the central and upper bands is sharp and prominent and near-horizontal, although fine material from the central band has been mixed with the upper band material. The upper band exhibits a single-grained microstructure. The majority of the mineral grains exhibit a preferred horizontal orientation. Simple packing voids; abundance 40%. Few irregular lenses occur and comprise dense inter-grain microaggregate microstructure. Complex packing voids; abundance 20%.

Fabric

The lowermost band is a well-sorted medium sand and exhibits a medium monic-related distribution. The lenses within this unit have a calcareous groundmass. Very few zones of phosphorous ash. The central band is a medium to fine well-sorted sand and exhibits a single-spaced enaulic-related distribution. The fine material is dark yellowish brown in PPL, isotropic to very weakly crystallitic in XPL and yellowish orange in OIL. The upper band is a well-sorted medium sand and exhibits a medium monic-related distribution.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 40%–50% in lower and upper bands and only 5% in the central band. The remainder of the mineral material comprises quartz grains and feldspars with 2% rock fragments. Few of the feldspars seriticized. Very few pyroxenes. Very few hematite grains in ash. Very few calcitic spherulites and biospheres in all the bands. Central band lens of virtually pure biogenic silica (phytoliths and diatoms) merging into black material (bright orange in OIL).

Basic organic component

Where present (central band and lens of fine material), few silt-sized charcoal. Few fine to medium sand-sized, slightly rounded and fragmentary charcoal inclusions; one large price of charcoal 5mm. Very few lenses of charred organic matter, very few rounded fragments of bone. Upper band has very discrete few charcoal fragments.

Pedofeatures

Fine material of ash reworked by soil biota and in the form of fused inter-grain microaggregates. Much of charcoal appears reworked and rounded. One large vertical veriform in the uppermost band that cuts into the central band; the fine material of the infilled channel comprises ash. Few to frequent partially infilled soil biota channels in the uppermost band. Few channels, some not infilled, others partially infilled with excrement, in the central band. Central band has few fragments of Fe-replaced root.

Sample 6949 MM5

This sample comprises a turf wall construction deposit (407) and windblown sand (408) from Shed 406 in phase 6. Three irregular bands of material are visible in thin section.

Microstructure

The lowermost band exhibits a single-grained microstructure. Simple packing voids; abundance 40%–50%. The boundary between the lowermost and central band is sharp and distinct; the boundary dips at *c.* 15°. The central band is roughly 20mm wide and also dips at *c.* 15°. It has an inter-grain microaggregate microstructure. Complex packing voids; abundance locally variable 40%–50%. The boundary between the central and upper band is irregular, diffuse and faint as fine material from the central band has been mixed with the upper band material. The upper band exhibits a single-grained microstructure. Simple packing voids; abundance 40%–50%.

Fabric

The lowermost band is a well-sorted medium sand and exhibits a medium monic-related distribution. The few small lenses within this unit (similar material to the central band) exhibit an enaulic-related distribution. The central band is a medium well-sorted sand and exhibits a single-spaced equal enaulic-related distribution. The fine material is dark brown in PPL, isotropic to very weakly crystallitic in XPL and orange yellow to yellow brown in OIL. The upper band is a well-sorted medium sand and exhibits a medium monic-related distribution. Few irregular lenses occur and comprise inter-grain microaggregate microstructure.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50%–70% in lower and upper bands and only 10%–15% in the central band. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few of the feldspars seriticized. Very few calcitic spherulites and biospheres in the central and uppermost band.

Basic organic component

Where present (central band and lenses of fine material), few to frequent silt-sized charcoal. Few fine to medium sand-sized, slightly rounded and fragmentary charcoal inclusions, very few fragments of bone, some burnt. Few fragmentary phytoliths, very few fragments of burnt bone in uppermost band.

Pedofeatures

In the lowermost and uppermost bands few poorly defined lenses of medium sand with inter-grain microaggregates; some appear to occur around channels. Few channels

defined by re-oriented mineral grains. In the central band the inter-grain microaggregates are the product of soil biota. Convoluted appearance to fabric, channels and rounded clasts are due to bioturbation.

Sample 6507 MM1

This sample was taken from context 204, the final 'floor' deposit in House 312 in phase 7. Three horizontal bands are visible.

Microstructure

The lowermost band exhibits a single-grained microstructure. Simple packing voids; abundance 30%–40%. The boundary between the lowermost and central bands is diffuse and faint. The central band has an inter-grain microaggregate microstructure. Complex packing voids; abundance locally variable 20%–40%. The boundary between the central and upper bands is irregular, sharp and prominent. The upper band exhibits an inter-grain microaggregate microstructure. Complex packing voids; abundance 20%.

Fabric

The lowermost band is a well-sorted medium sand and exhibits a medium monic-related distribution. Very few rounded lenses of siliceous ash with fine silt-sized mineral grains (1mm long) comprising mainly fragmentary phytoliths. The central band is a well-sorted medium sand, with a weak horizontal-preferred orientation, and exhibits a single-spaced fine enaulic-related distribution. The fine material is dark brown in PPL, isotropic to very weakly crystallitic in XPL and orange yellow in OIL. Very few lenses of phosphatic ash (?) with common fragmentary phytoliths. Few horizontal lenses of probable peat ash. The upper band is a poorly sorted medium sand and exhibits a single-spaced enaulic-related distribution. The fine material comprises different materials and is yellow to dark brown to black in PPL and yellow to orange brown in OIL.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 70% in lower band, 30% in the central band and 50% in the upper band. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments in the lower and central bands but *c.* 30% in the upper band in the form of several large (up to 5mm) rock fragments. Few of the feldspars are seriticized. Very few calcitic spherulites and biospheres in the central and lowermost band. Very few medium sand-sized grains of sparite.

Basic organic component

Where present few to frequent silt-sized charcoal in the fine material. Very few bone fragments (some burnt) in all three bands. Very few of these have a very porous texture; possible bird or fish bone in the central band. Very few fragments of cellular charcoal. Upper band has common dense charcoal, occurring in a fragmentary linear band *c.* 30mm long. Phosphate occurs within the pores and voids, with common fragmentary biogenic silica. Some parts contain both mineral grains, the larger rock fragments and shell fragments.

Pedofeatures

In the lowermost band few inter-grain microaggregates (faecal pellets) comprising remnants of ash. Very few rounded lenses of micrite cement (up to 3mm) around mostly quartz feldspar mineral grains with few shell fragments in the central band; these occur in a fragmentary horizontal band. Some of the bone fragmentary and rounded. All the units have been mixed by actions of soil biota, resulting in the breaking-up of laminations and presence of infilled channels and voids.

Sample 6507 MM2

This sample was taken from context 204, the final 'floor' deposit in House 312 in phase 7. Two horizontal bands are visible.

Microstructure

The lowermost band exhibits a single-grained microstructure. Simple packing voids; abundance 40%. The boundary is diffuse and faint. The upper band has an inter-grain microaggregate microstructure. Complex packing voids; abundance locally variable 20%–30%.

Fabric

The lowermost band is a well-sorted medium sand, although there are two large shell fragments (10mm) and one large rock fragment (5mm); weak horizontal-preferred orientation. The lower band exhibits a medium monic-related distribution. The upper band is a well-sorted medium sand and exhibits a single-spaced equal enaulic-related distribution. The fine material is dark brown in PPL, isotropic to very weakly crystallitic in XPL and orange brown in OIL.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50% in lower band and 30%–40% in the upper band. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 5% rock fragments in the lower band. Few of the feldspars are seriticized. Very few calcite biospheres. Very few medium sand-sized grains of sparite. Two fragments of rounded pottery in the lower band. Thin, broken lamination of micrite cement (up to 1mm Th) in lower band. Discontinuous, horizontal band of micrite cement occurs at boundary between upper and lower band (1–2mm Th). Frequent acicular calcite in upper band, occurs in clusters in voids and within pores of shell fragments and appears

associated with fragmentary charcoal. Few acicular calcite in lower band, occurs just below upper band.

Basic organic component

Very few medium sand- and grit-sized fragments of charcoal in the lower band. Two burnt fragments (1mm) of burnt organic matter, red in PPL and dark brown in XPL and OIL. Few rounded clasts of mineral ash in the lower band. Large burnt bone fragment (20mm long) with large pores, very few sand-sized bone fragments. In the upper band where present few to frequent silt-sized charcoal in the fine material. Very few fragments of cellular charcoal in upper band. Few broken, dense fragments of charcoal associated with fine ash material and some phosphate staining. Very few fragments of bone, some burnt, other probable bird/fish bone.

Pedofeatures

In the lowermost band few inter-grain microaggregates (faecal pellets) comprising remnants of ash. Upper band inter-grain microaggregates common. Few fabric pedofeatures in lower band, product of bioturbation (*i.e.* rounded clusters of mineral grains – infilled channel).

Sample 6836 MM13

This sample comprises an upper layer (context 204, the final 'floor' deposit) and a lower layer (floor 206) from House 312 in phase 7.

Microstructure

Inter-grain microaggregate microstructure dominates. Complex packing voids; abundance 10%–15%. The boundary between the two contexts is diffuse and faint and appears to be wavy; much disturbed by post-depositional bioturbation.

Fabric

Discontinuous lens of compacted sand at base of slide within 206; weak horizontal orientation. Both units appear dominated by a single-spaced enaulic-related distribution, equal in 204 and fine in the lens within 206. The fine material of the lens in 206 is pale yellowish brown (PPL and OIL). In 204 fine material is predominantly dark brown to black in PPL, pale yellowish brown in OIL (amorphous organic matter, goethite and other Fe gels) and isotropic in XPL (undifferentiated b-fabric).

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 5% in 206 and 10% in 204 and remainder of mineral material quartz grains and feldspars with 2% rock fragments. Few of the feldspars seriticized. Very few pyroxenes. Very few calcite biospheres and spherulites. Very few sparite-dominated grains. In the lens within 206 granular matrix with frequent fragmentary phytoliths and very few diatoms. Very few lenses dominated by biogenic silica. In 204 fine material largely masked by Fe gels but a few fragments of biogenic silica visible. Very few calcite biospheres.

Basic organic component

Context 206: very few bone fragments (some burnt), silt-sized to *c.* 1mm, possible fish vertebrae; charcoal/charred organic matter *c.* 30%, some charcoal up to 2mm in length, most broken up by activities of soil biota though original fragment size still visible. Context 204: fine silt-sized charcoal disseminated throughout fine material; charred organic matter and/or charcoal fragments *c.* 30%, much within inter-grain microaggregates. Larger charcoal (up to 1mm) is mostly rounded and some contains mineral grains. Very few to few bone fragments (including possible fish bone); silt-sized fragments up to 2mm. Much, but not all, bone lies roughly along the horizontal. At base large clast of turf ash with lots of calcite spherulites within it.

Pedofeatures

Context 206: occasional lenses where matrix very dense. Contexts 206 and 204: Inter-grain microaggregates, dense, silt- to medium sand-sized. Fabric pedofeatures, some sub-rounded clasts up to 2mm dia., others infilled fauna channels and others stacked mineral grains.

Sample 6837 MM17

This sample was taken from hearth deposits (205 lower layer; 206 upper layer) in House 312 in phase 7.

Microstructure

Inter-grain microaggregate microstructure dominates both contexts. Complex packing voids. In 205 there are five bands of silty sand and sand, although nine laminations are apparent at the macro scale in the lowermost silty sand band. The lowermost sand-dominated band exhibits a weak coarsening upwards sequence. The bands dip at *c.* 15°. The abundance of voids is locally variable depending upon whether a fine-grained (silty sand) lamina is being observed (5%) or a coarser-grained lamina (sand) (10%–20%). In 206 abundance of voids *c.* 5%–10%. Microlaminated towards top of slide, overlying 15–25mm lowermost sand band. Upper lamina 1–5mm Th, dipping 15° in opposite direction to that of the lower unit (205). The boundary between the two contexts is clear and distinct although much disturbed by post-depositional bioturbation.

Fabric

The sand laminations in both units appear dominated by a close fine enaulic-related distribution. The laminations in both contexts are moderately well-sorted, with occasional grit-sized mineral grains and rock fragments with both silt-sand and sand laminations. The fine material of both contexts is dark brown (PPL), brownish yellow to orange/ yellow (OIL), 206 isotropic in XPL (undifferentiated b-fabric). In 206 under OIL bands of peat ash (orange) and

wood ash (brownish yellow) are visible, but mixed nature of ash (wood mixed with peat ash).

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 2%–5% in 205 (less in sand than in silty-sand laminations) and 2%–5% in 206 with the exception of the lowermost band of sand (*c.* 15%). The remainder of the mineral material is quartz grains and feldspars with 2% rock fragments (one large, rounded rock fragment, cut but 7mm long). Few of the feldspars seriticized. Very few pyroxenes. In both contexts very few fragmentary phytoliths and diatoms. In 206 very few rounded clasts of pure, fused silica ash, and a thin band of pale yellow silt with frequent phytoliths, mixed with mineral grains and charcoal fragments, yellow in OIL (phosphatic?). Single biosphere in 205. Very few calcite spherulites in 205 and 206.

Basic organic component

In 205 frequent silt-sized charcoal disseminated in the fine material, although some of the finer ash material in this silt-sized charcoal is few in frequency. This material has very few fragmentary biogenic silica. Few fine to medium sand-sized, rounded and fragmentary charcoal inclusions. One large fragmented charcoal fragment (10mm) in the uppermost band, also associated with a thin burnt micrite coating to the outer edges of the charcoal inclusion. This material extends away from the charcoal and forms an irregular deposit with mineral grain inclusions and very few fragmentary phytoliths. Very few fragments of bone (some burnt) up to 2mm long, very few fragments of organic matter comprising single cell. In 206 micrite also associated with occasional larger clasts of charcoal. Frequent silt-sized charcoal within fine material. Discontinuous bands of charcoal. Very few mycorrhizal sheaths, very few sand-sized bone fragments (one fragmentary elongated piece). Interbedded wood ash bands near top of slide.

Pedofeatures

Inter-grain microaggregates product of soil biota, some post-depositional but some appears to have occurred prior to deposition. Large rounded clasts of compact ash (>10mm long) within the lowermost sand band of 206, a few of these in this band. The material within the clast affected by soil biota, but the edges of the clast sharp and not affected by soil biota while in the sand band. Very few channels. Very few roots, one in 205 with micrite pseudomorph.

Sample 6878 MM14

This sample comprises contexts 214, 205, 206 and 204, floor and hearth deposits from House 312 in phase 7. Four ill-defined bands of material are visible in thin section.

Microstructure

The lowermost band (214) exhibits a complex microstructure comprising both single-grained and inter-grained microaggregate. Complex packing voids; abundance 40%. The next band (205) has a weakly developed inter-grained microaggregate microstructure. Complex packing voids; abundance 35%. Context 206 exhibits a single-grained microstructure with odd zones of inter-grained microaggregate microstructure. Simple packing voids; abundance 40%. Context 204 exhibits a complex microstructure comprising both single-grained and inter-grained microaggregate. Complex packing voids; abundance locally variable 20%–35%. Diffuse and faint boundaries between all contexts. Dipping 25° between 214 and 205, 12° between 205 and 206 and 30° between 206 and 204.

Fabric

Context 214 is a well-sorted medium sand and exhibits single-spaced fine enaulic-related distribution; where there are no microaggregates this is medium monic. Where present the fine material is dark brown in PPL, yellowish brown in OIL and isotropic in XPL. Context 205 is a well-sorted medium sand and exhibits single-spaced fine enaulic-related distribution. Where present the fine material is dark brown in PPL, yellowish brown in OIL and isotropic in XPL. Clast of sandy peat 2mm dia. in 205. Context 206 is a well-sorted medium sand and exhibits a medium monic-related distribution. Lens of fine material mixed with mineral grains and charcoal. Context 204 is a moderately sorted deposit with medium sand-sized grains (dominated by quartz and feldspars) and larger medium sand-sized grains (many of which are shell fragments). It exhibits single-spaced fine enaulic-related distribution; where there are no microaggregates this is medium monic. Some fine material adhering to mineral grains is bright orange in OIL. Very few sub-rounded clasts of mineral ash 4mm long (fine material orange/yellow in OIL) in 204. Similar clasts in 214; these lack the fine silt-sized charcoal inclusions. In 206 two ash types juxtaposed in single clast. Very few clasts of ash 1–2mm (with silt-sized charcoal) in 206.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 30%–50% in all four contexts. The remainder of the mineral material is quartz grains and feldspars with 2% rock fragments. Few of the feldspars seriticized. Very few pyroxenes. Very few biospheres in 214 and 204. Single calcitic spherulite in 206. Very few fragmentary biogenic silica in the fine material of 205 and 204.

Basic organic component

Where present, frequent silt-sized charcoal disseminated in the fine material in all contexts. Few fine to medium sand-sized, rounded and fragmentary charcoal inclusions

in all contexts. Very few bone fragments, largest up to 5mm in length, occur in every context. Very few burnt sclerotia in 206.

Pedofeatures

Inter-grain microaggregates, few (214, 205, 206) and frequent (204).

Sample 6879 MM16

This sample was taken from context 204, the final 'floor' deposit in House 312 in phase 7. Two bands of material are visible in thin section.

Microstructure

The lowermost band exhibits a single-grained microstructure with odd zones of inter-grained microaggregate microstructure. Simple packing voids; abundance 35%. The upper band has a complex microstructure with some weakly developed inter-grained microaggregate microstructure, pellicular microstructure and single-grained microstructure. Complex packing voids; abundance 40%. The boundary between the two bands is diffuse and faint.

Fabric

Context 204 is a well-sorted medium sand. The lower band exhibits a medium monic-related distribution. In the lower band large clast of fine sand (no shell) with brown fine material (PPL) between the grains (no voids), yellowish/orange in PPL, with very few fragmentary phytoliths. Clast of ash with linear charcoal fragments located below the former (5mm). The upper band exhibits a single-spaced fine enaulic-related distribution. The fine material is dark brown in PPL, isotropic in XPL and yellowish brown in OIL. Few clasts of ash in upper band rich in phosphate, one with sclerotia.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50% in lower band and 30% in upper. The remainder of the mineral material quartz grains and feldspars with 2% rock fragments. Few of the feldspars seriticized. Very few pyroxenes. Very few calcitic spherulites and biospheres in both bands.

Basic organic component

Where present, frequent silt-sized charcoal disseminated in the fine material. Few fine to medium sand-sized, rounded and fragmentary charcoal inclusions in both bands. Very few cellular charcoal fragments (2mm long). Very few bone fragments (one rounded), associated with phosphate staining of some of the fine material; bone present in both layers. Clast of ash with burnt bone fragment in upper layer. Upper band amorphous organic matter mixed with peat/turf ash.

Pedofeatures

Very few channels.

Sample 6371

This sample was taken from context 204, the final 'floor' deposit in House 312 in phase 7. It contains five distinct units: (1) a well-sorted medium windblown sand, (2) a well-sorted organic/ash sand; (3) a well-sorted windblown sand with organic ash; (4) a well-sorted organic ash; and (5) a well-sorted windblown sand.

Microstructure

The lowermost unit (1) exhibits a single-grained microstructure. Simple packing voids; abundance 30%. The boundary into a thin broken band (2; 5mm Th) is sharp and prominent. (2) has an inter-grained microaggregate microstructure. Complex packing voids; abundance 10%. The boundary between the thin band and the third unit is sharp and prominent. (3) exhibits a complex microstructure with both a weakly developed inter-grain microaggregate and pellicular microstructure. Complex packing voids dominate; abundance 20%. The boundary between (3) and (4) is sharp and prominent. (4) exhibits a complex microstructure with a dominant vughy microstructure with some areas of inter-grain microaggregate microstructure. The boundary between (4) and (5) is sharp and prominent. (5) is dominated by a single-grained microstructure. Simple packing voids; abundance 30%.

Fabric

All the units contain well-sorted medium sand. (1) and (5) exhibit a medium monic-related distribution. (2) and (3) exhibit a single-spaced fine enaulic-related distribution, and (4) a single-spaced porphyric-related distribution. (4) comprises juxtaposed clasts of slightly different kinds of ash (clasts from 500µm to 4–5mm in size). The fine material in all the units is dark reddish brown to brown in PPL, isotropic in XPL and orange/yellow in OIL; the fine material in (2) contains a small amount of silt and that in (4) is slightly more yellow in colour in OIL.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50%–70% in (1), 30%–40% in (2), 50% in (3), less than 2% in (4) and 50%–70% in (5). The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few of the feldspars are seriticized. Very few calcite biospheres in (1) and (4) and medium grains of sparite in (3). Few fragmentary phytoliths in the fine material of (2) and (3). Common fragmentary biogenic silica with very few diatoms in (4). Micrite ash in (4).

Basic organic component

The fine material contains few silt-sized charcoal frag-

ments. There are very few sand-sized charcoal fragments in all but the lowermost unit. Very few small clasts (1mm) of phosphatic-rich organic matter in (1), (2) and (3). Very few roots in (4), very few fungal spores. Few burnt bone fragments.

Pedofeatures

The inter-grain microaggregates are faecal pellets; all units to some extent bioturbated.

Sample MM3

This sample was taken from contexts 107 (lower) and 106 (upper), abandonment fills of the entrance passage to House 007 in phase 8. However, it comprises three bands or units. The thin section has been over-ground and one side lost.

Microstructure

The lowermost band exhibits a complex microstructure with a weakly developed inter-grain microaggregate microstructure and single-grained microstructure. Complex packing voids dominate; abundance 40%–50%. The boundary between the lowermost and the central bands is diffuse and faint. The central band exhibits a single-grained microstructure. Simple packing voids; abundance 30%. The boundary between the central and uppermost bands is diffuse and faint. The uppermost band exhibits a weakly developed inter-grained microaggregate microstructure. Complex packing voids; abundance 30%.

Fabric

All the bands largely comprise well-sorted medium sand, with only the lowermost exhibiting a weak horizontal-preferred orientation of the elongated shell fragments. The upper and lower bands exhibit a single-spaced fine enaulic-related distribution. The fine material is dark brown to black in PPL, isotropic in XPL and orange in OIL.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50% in lowermost unit, 50%–70% in central unit and 107, and 40% in the upper unit. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments. Few of the feldspars are seriticized. Very few calcite biospheres in all units and medium grains of sparite in lower unit. Frequent large acicular calcite star-like crystals growth in the lower unit. Very few grains of hematite in 107. Few fragmentary biogenic silica in fine material in upper and lower units (includes diatoms in upper unit). Very few calcite spherulites in upper unit.

Basic organic component

In fine material few silt-sized charcoal fragments. In upper unit very few burnt sclerotia. Very few bone fragments (some burnt), some fish, most amorphous, occur in all units. One large piece of charcoal in upper unit (15mm), possibly peat. Very few fungal spores in lower unit.

Pedofeatures

The inter-grain microaggregates are faecal pellets. All units to some extent bioturbated, and microaggregates are very few in the central unit. Frequent channels in upper band.

Sample MM4

This sample comprises four units, from contexts 109, 108/101, 107 and 106 from the entrance passage to House 007 in phase 8. Context 109, a construction layer, is described as a light red-brown sand; 108/101, a dark brown to black organic sand, was a passageway floor. Context 107, a light grey-brown sand, and 106, a dark grey-brown sand, were abandonment fills of the passageway.

Microstructure

The lowermost unit (109) exhibits a complex microstructure, with much single-grained microstructure and *c.* 10% inter-grain microaggregate microstructure. Simple and complex packing voids; abundance 30%. The boundary into 108/101 (5mm Th) is sharp and prominent. Context 108/101 has an inter-grained microaggregate microstructure. Complex packing voids; abundance 15%–20%. The boundary between 108/101 and 107 is sharp and prominent. Context 107 exhibits a weakly developed inter-grain microaggregate microstructure. Complex packing voids dominate; abundance 10%–15%. The boundary between 107 and 106 is diffuse and faint. Context 106 exhibits a weakly developed inter-grain microaggregate microstructure. Complex packing voids; abundance 30%.

Fabric

All the units largely comprise well-sorted medium sand with a weak horizontal-preferred orientation of the elongated shell fragments, and all exhibit a close fine enaulic-related distribution. The fine material in all the units is dark reddish brown to black in PPL, isotropic in XPL, with the exception of 108/101 where it is weakly crystallitic, and for all the units except 108/101 orange/yellow in OIL, being predominantly black in 108/101.

Basic mineral component and rock fragments

Grains of quartz and feldspar generally sub-rounded with smooth sphericity. Shell fragments (most micritic) tabular with smooth sphericity. Shell fragments *c.* 50%–70% in 109, 20%–30% in 108/101, 50% in 107, and 50%–70% in 106. The remainder of the mineral material comprises quartz grains and feldspars with *c.* 2% rock fragments; slightly more igneous rock fragments in 109. Few of the feldspars are seriticized. Very few rounded clasts of biogenic silica in 109. Very few calcite biospheres in 109, 108/101, 107 and 106 and medium grains of sparite in 109, 108/101, 107. Very few large acicular calcite crystals

grown around mineral grains and within voids in 108/101; often inter-grown with micrite; also acicular calcite and micrite-subsumed fragmentary phytoliths. Very few grains of hematite in 107. In 108/101 very few rounded yellow (PPL and OIL) clasts containing fragmentary phytoliths. In 108/101 rounded clast comprising sand-sized quartz grains set in goethite matrix (clast *c.* 1mm) surrounded by ash and acicular calcite crystals. Very few clasts of micritic cement in 109, within which are charcoal fragments.

Basic organic component

In fine material few silt-sized charcoal fragments in all the units except in 108/101 where it is common to dominant. Very few bone fragments, some fish, most amorphous, in 109, 108/101, 107 and 106; one large bone fragment (5mm) in 109. Very few medium charcoal fragments (3mm) in 109 and 107 (5mm). Common charcoal in 108/101, much degraded, most medium sand-sized. Very few mycorrhizal sheaths of *Cenococcum geophilum* and very few fungal spores in 108/101. In 108/101 few rounded clasts comprising fragmented linear charcoal set in fine yellow matrix.

Pedofeatures

Micrite crystals grown within bone fragment in 108/101. Very few spherical fabric pedofeatures in 107. The inter-grain microaggregates are faecal pellets; all units to some extent bioturbated.

24 Radiocarbon dating

P. Marshall, M. Parker Pearson and G. Cook

24.1 Introduction

Twenty-nine radiocarbon age determinations were obtained on samples from Cille Pheadair. The samples comprised animal bones, carbonized plant remains, charcoal, and charred residues adhering to the interior of ceramic sherds.

24.2 Methods

The samples were dated at the Scottish Universities Research and Reactor Centre (SURRC, now SUERC) in East Kilbride in 2004–2005. The bones were pre-treated using a modified Longin method (Longin 1971), with the carbonized plant remains, charcoal and organic residues adhering to the interior of ceramic sherds by the acid-base-acid protocol (Stenhouse and Baxter 1983). The samples were converted to carbon dioxide in pre-cleaned sealed quartz tubes (Vandeputte *et al.* 1996), graphitized as described by Slota *et al.* (1987) and measured by AMS (Xu *et al.* 2004).

The laboratory maintains a continual programme of quality assurance procedures, in addition to participation in international inter-comparisons (Scott 2003). These tests indicate no laboratory offsets and demonstrate the validity of the precision quoted.

24.3 Results

The radiocarbon results are given in Table 24.1, and are quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986). They are conventional radiocarbon ages (Stuiver and Polach 1977).

Calibration

The calibrations of the results, relating the radiocarbon measurements directly to calendar dates, are given in Table 24.1 and in outline in Figure 24.1. All have been calculated using the calibration curve of Reimer *et al.* (2009) and the computer program OxCal v4.1.5 (Bronk Ramsey 1995; 1998; 2001; 2008). The calibrated date ranges cited in the text are those for 95% confidence. They are quoted in the form recommended by Mook (1986), with the end points rounded outwards to 10 years. The ranges quoted in italics are *posterior density estimates* derived from mathematical modelling of archaeological problems (see below). The ranges in plain type in Table 24.1 have been calculated according to the maximum intercept method (Stuiver and Reimer 1986). All other ranges are derived from the probability method (Stuiver and Reimer 1993).

Methodological approach

A Bayesian approach has been adopted for the interpretation of the chronology from this site (Buck *et al.* 1996). Although the simple calibrated dates are accurate estimates of the dates of the samples, this is usually not what archaeologists really wish to know. It is the dates of the archaeological events, which are represented by those samples, which are of interest. In the case of Cille Pheadair, it is the chronology of the use of the settlement and the date of the various structures that are under consideration, not the dates of the samples themselves. The dates of this activity can be estimated not only using the absolute dating information from the radiocarbon measurements on the samples, but also by using the stratigraphic relationships between samples.

Fortunately, methodology is now available which allows the combination of these different types of information explicitly, to produce realistic estimates of the dates of interest. It should be emphasized that the *posterior density estimates* produced by this modelling are not absolute. They are interpretative *estimates*, which can and will change as further data become available and as other researchers choose to model the existing data from different perspectives.

The technique used is a form of Markov Chain Monte Carlo sampling, and has been applied using the program OxCal v4.1.5 (http://c14.arch.ox.ac.uk/). Details of the

Table 24.1. Cille Pheadair radiocarbon results

Context	Material	Lab no.	Radiocarbon date	$\delta^{13}C$	$\delta^{15}N$	Calibrated date (68.2%)	Calibrated date (95%)
Phase 1							
758	*Hordeum*	SUERC-4910	990±35	-23.3		990–1040 (42.8%), 1090–1120 (14%), 1140–1160 (11.4%)	980–1160
723	*Hordeum*	SUERC-5080	905±35	-23.1		1040–1100 (36.3%), 1110–1190 (31.9%)	1030–1220
765	Carbon residue	SUERC-4891	980±35	-25.5		1000–1050 (31.4%), 1090–1160 (36.8%)	990–1160
607	*Bos*	SUERC-4873	910±40	-21.4	5.7	1030–1190	1020–1220
602	Carbon residue	SUERC-4889	1060±40	-24.8		900–920 (11.7%), 960–1020 (56.5%)	890–1030
Phase 2							
721	*Hordeum*	SUERC-4909	970±40	-24.9		1010–1060 (26.7%), 1080–1160 (41.5)	990–1170
579	Seed	SUERC-4903	955±35	-23.4		1020–1070 (26.8%), 1080–1160 (41.4%)	1000–1190
582	Carbon residue	SUERC-4888	850±35	-25.8		1160–1250	1040–1090 (9.6%), 1120–1140 (5.6%), 1150–1280 (80.2%)
601	*Hordeum*	SUERC-4907	955±35	-24.1		1020–1060 (23.4%), 1080–1160 (44.8%)	1000–1190
618	Carbon residue	SUERC-4890	1135±40	-25.0		880–985	780–990
619	*Hordeum*	SUERC-4908	965±40	-23.5		1020–1070 (27.5%), 1080–1160 (40.7%)	990–1190
Phase 3							
701	*Betula*	SUERC-4901	910±40	-26.9		1030–1190	1020–1220
701	*Betula*	SUERC-4902	955±40	-27.0		1020–1070 (26.8%), 1080–1160 (41.4%)	1000–1190 (95.4%)
Phase 4							
569	Carbon residue	SUERC-4887	1025±40	-26.2		970–1040 (67.0%), 1140–1150 (1.2%)	890–930 (6.7%), 940–1050 (76.8%), 1080–1160 (11.9%)
555	*Hordeum*	SUERC-4900	1030±40	-20.9		900–920 (2.6%), 970–1040 (65.6%)	890–930 (8.4%), 940–1050 (78.3%), 1090–1160 (8.7%)
548	Carbon residue	SUERC-4883	940±35	-26.2		1030–1070 (24.2%), 1080–1160 (44.0%)	1020–1190
Phase 5							
533	Carbon residue	SUERC-4882	930±40	-25.8		1030–1160	1020–1210
503	Seed	SUERC-4899	990±35	-22.0		990–1040 (42.8%), 1090–1120 (14.0%), 1140–1160 (11.4%)	980–1160
503	Seed	SUERC-5079	980±35	-23.1		1000–1050 (31.4%), 1090–1160 (36.8%)	990–1160
Phase 6							
394	Carbon residue	SUERC-4881	980±40	-26.1		1000–1050 (31.1%), 1080–1160 (37.1%)	980–1170

Table 24.1. continued

382	Carbon residue	SUERC-4880	965±35	-25.8		1020–1060 (23.3%), 1080–1160 (44.9%)	1000–1170
376	Carbon residue	SUERC-4879	1080±40	-26.8		890–930 (21.5%), 950–1020 (46.7%)	890–1030
367	Carbon residue	SUERC-4878	890±40	-25.9		1040–1090 (25.5%), 1120–1140 (10.9%), 1150–1220 (31.9%)	1020–1240
Phase 7							
209	Carbon residue	SUERC-4877	995±40	-25.8		990–1050 (43.6%), 1090–1120 (14.3%), 1140–1160 (10.3%)	970–1160
200	*Bos*	SUERC-4872	880±35	-21.3	4.4	1060–1090 (14.5%), 1120–1140 (9.7%), 1150–1220 (43.9%)	1030–1250
Phase 8							
065	*Avena*	SUERC-4898	855±40	-23.1		1070–1080 (1.6%), 1120–1140 (2.9%), 1150–1260 (63.7%)	1040–1100 (15.5%), 1110–1280 (79.9%)
064	*Hordeum*	SUERC-4897	785±35	-21.8		1220–1235 (13.1%), 1240–1280 (55.1%)	1185–1290
Phase 9							
042	*Hordeum*	SUERC-4893	855±40	-23.5		1040–1090 (22.6%), 1120–1140 (9.8%), 1150–1220 (35.9%)	1030–1250
011	*Avena*	SUERC-4892	805±40	-23.7		1210–1275	1160–1290

algorithms employed by this program are available from the on-line manual or in Bronk Ramsey (1995; 1998; 2001; 2009). The algorithm used in the models described below can be derived from the structures shown in Figures 24.1 and 24.6.

The following section concentrates on describing the archaeological evidence, which has been incorporated into the chronological model, and explaining the reasoning behind the interpretative choices made in producing the models presented. These archaeological decisions fundamentally underpin the choice of statistical model.

Objectives and sampling strategy

The radiocarbon dating programme was designed to achieve the following objectives, to provide:

- an overall estimate of the start, end, and duration of activity;
- estimates of the dates of various structural phases.

The first stage in sample selection was to identify short-lived material that was demonstrably not residual in the context from which it was recovered. The taphonomic relationship between a sample and its context is the most hazardous link in this process, since the mechanisms by which a sample came to be in its context are a matter of interpretative decision rather than certain knowledge. All samples consisted of single entities (Ashmore 1999). Material was selected only where there was evidence that a sample had been put fresh into its context. The main category of materials that met these taphonomic criteria was articulating bone. Articulated animal bone deposits must have been buried with tendons attached or the bones would not have remained in articulation, and so were almost certainly less than six months old when buried (Mant 1987: 71). Other samples with a less certain taphonomic origin that were submitted included:

- Charred residues adhering to the inside of ceramic sherds. Sherds were selected that cross-joined with other fragments from the same context or were large and unabraded, suggesting that the residue/sherd had not been exposed to weathering for a long period of time.
- Carbonized plant remains from the fills of postholes. These were interpreted as relating to the use of a structure rather than its construction, as suggested by experimental archaeology (Reynolds 1995). Other such samples came from the primary fill of pits.
- Charcoal from distinct concentrations – where a deposit was fresh and appeared to be functionally related to the context from which it was recovered (*e.g.* fuel from the use of hearths).
- Carbonized plant remains from floor layers – interpreted as material incorporated into the floor during its use.

Once suitable samples had been identified a model was devised which incorporated the archaeological information along with simulated radiocarbon results. The radiocarbon

results were simulated using the R_Simulate function in OxCal, with errors based on the material to be analysed and the type of measurement required (*e.g.* single run AMS). This was used to determine the number of samples that should be submitted in the dating programme.

The sequence

The possible post-built structure

The two parallel lines of postholes running north–south may be the remains of a post-built structure preceding the sequence of turf- and stone-walled longhouses. A single charred *Hordeum vulgare* grain (SUERC-5080; 905±35 BP) from a posthole (723) forming part of the eastern line and relatively rich in carbonized barley grains, was submitted for dating.

Pits, postholes and deposits above them

A sample from the earliest activity within the embanked area comprised a single charred *Hordeum vulgare* grain (SUERC-4910; 990±35 BP) from the fill (758) of a sub-rounded pit (759) between the eastern and western pit alignments. The pit fill (758) contained a significant quantity of carbonized grain that seems to represent a deliberate dump of material. Two of the pits in the southern end of the embanked area were sealed by 721, a layer of trampled peat ash that provided a single charred *Hordeum* sp. grain (SUERC-4909; 970±40 BP); neither of the pits beneath 721 contained material dated as part of this programme.

A carbonized residue (SUERC-4891; 980±35 BP) came from the fill (765) of an elongated sub-rounded pit (764). This pit (764) was sealed by a thick deposit of black and orange sands (579), representing re-deposited peat ash; a single charred seed (SUERC-4903; 955±35 BP) was submitted from this context. Given that the deposit is re-deposited, SUERC-4903 only provides a *terminus post quem* for the overlying deposits. Layer 579 was overlain by an extensive spread of compacted organic sand (582) that sealed a number of pits and postholes, including 764. A charred residue (SUERC-4888; 850±35 BP) came from 582 and conjoining cow phalanges (SUERC-4873; 910±40 BP) from layer 607. These two measurements are statistically consistent (T' = 1.3; ν = 1; T'(5%) = 3.8; Ward and Wilson 1978) and thus the samples may be of the same actual age.

Layers 607 was sealed by an extensive spread of dark organic sand (602) which also covered pit 604. A carbonized residue (SUERC-4889; 1060±40 BP) came from 602. The central part of 602 was overlain by 601 (SUERC-4907; 955±35 BP; single charred *Hordeum vulgare* grain), a localized spread of peat ash, while its northern part was overlain by 618 (SUERC-4890; 1135±40 BP; carbonized residue) that was itself overlain by 619 (SUERC-4908; 965±40 BP; single charred *Hordeum vulgare* grain). Whilst these deposits are earlier than the construction of House 500, it is not possible to stratigraphically relate them to House 700. It is probable that they pre-date it; however, they may equally have continued to accumulate after the house was constructed.

The sequence of longhouses and other structures

House 700 was the first stone longhouse to be built within the embanked area. The floor of the house (701) was relatively thin and ephemeral. Although there was no formal setting for a hearth, it was clearly delimited by the thick layer of dark orange and black peat ash that covered the central part of the house. Two single pieces of short-lived *Betula* charcoal (SUERC-4901; 910±40 BP and SUERC-4902; 955±40 BP) from the hearth (774=701) were submitted for dating.

Most of House 700 was demolished when House 500 was constructed. The first deposit to be laid down in House 500 was layer 569, from which a carbonized residue was dated (SUERC-4887; 1025±40 BP). The finds of pottery and animal bone from layer 569 were not highly fragmented, and it is not thought to have been an occupation deposit, but rather a foundation or levelling layer. The material within it might therefore be residual or related to activity between the abandonment of House 700 and the construction of House 500. SUERC-4887 therefore only provides a *terminus post quem* (*tpq*) for its context. The hearth (555) that ran down the middle of the main room of House 500 was 7.40m long and up to 2.30m in width. A single carbonized *Hordeum vulgare* grain (SUERC-4900; 1030±40 BP) from the hearth (555) was submitted for dating. The final floor accumulation within the house was layer 548=504, from which a carbonized residue (SUERC-4883; 940±35 BP) was dated.

Subsequent modification and rebuilding of House 500 followed with the construction of a double-skinned wall constructed across the north end of the house; a carbonized residue (SUERC-4882; 930±40 BP) came from the brown sand (533) that formed the wall core.

The hearth (503) for the Stage II use of House 500 survived as multi-lensed black to orange peat ash. Measurements on the two carbonized seeds from the hearth are statistically consistent (T' = 0.0; ν = 1; T'(5%) = 3.8; Ward and Wilson 1978; SUERC-5079; 980±35 BP and SUERC-4899; 990±35 BP) and they could therefore be of the same age.

After House 500 Stage II went out of use, its floor was covered by a series of windblown sands and other layers. Following this two small buildings were constructed, Shed 406 and Shed 400. Two east–west aligned walls were placed directly onto the midden deposit (394) that accumulated at the northern end of House 500 following its abandonment, to form Shed 406. A carbonized residue (SUERC-4881; 980±40 BP came from within the midden deposit (394) that also contained a worn silver quatrefoil penny of King Cnut dated to AD 1017–1023 that provides a *tpq* for the context. The second surviving floor layer (382) within the sunken-floored building Shed 406 provided a carbonized residue (SUERC-4880; 965±35 BP). This was subsequently overlain by a number of layers including 376, a clean white sand from which carbonized residue (SUERC-4879; 1080±40 BP) was dated. Abutting Shed 406 was a second small structure, Shed 400, and when this shed went out

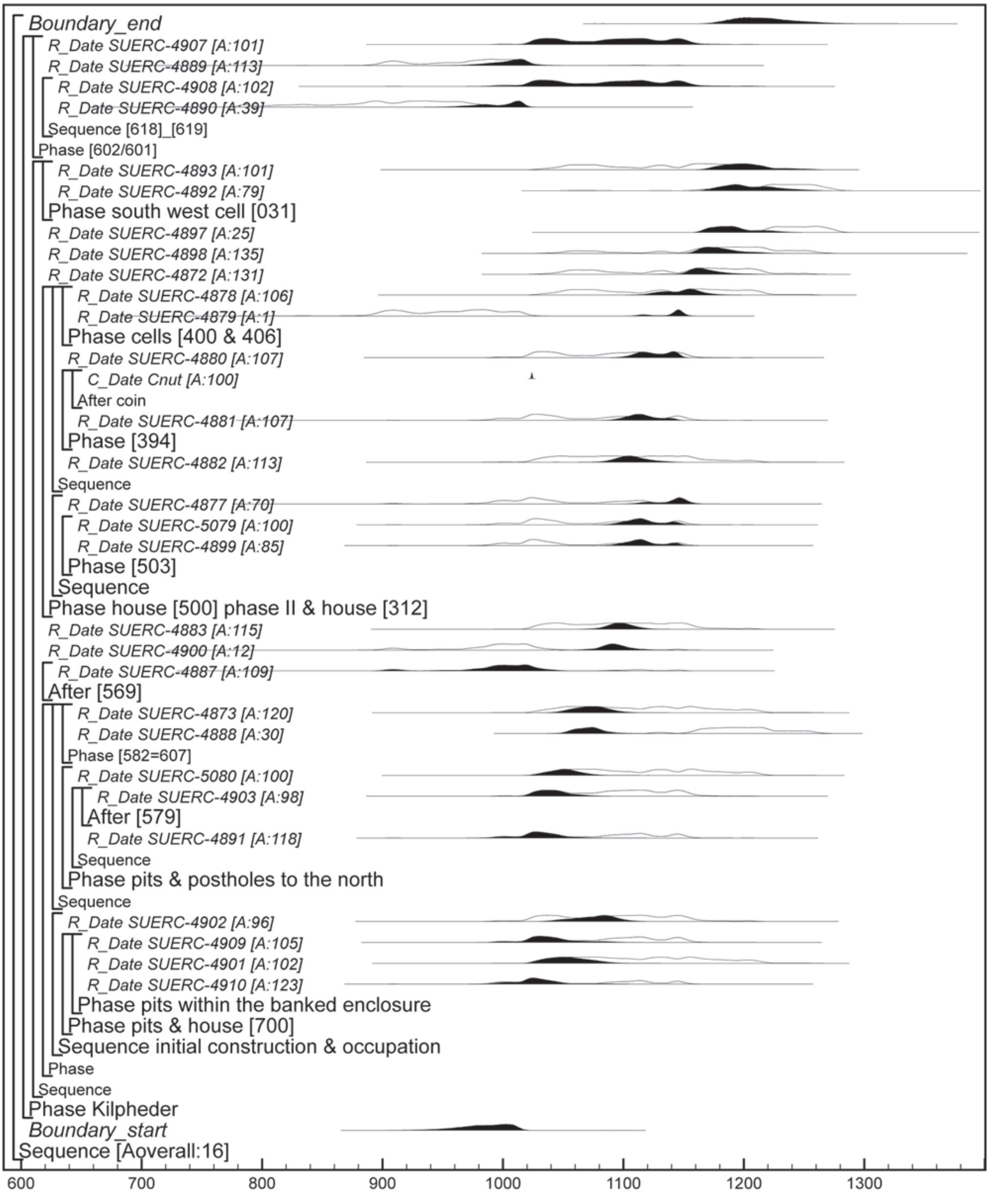

Figure 24.1. Probability distributions of dates from Cille Pheadair: each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. Distributions other than those relating to particular samples correspond to aspects of the model. For example, the distribution Boundary_start is the estimated date when activity at Cille Pheadair started. The large square brackets down the left-hand side along with the OxCal keywords define the model exactly

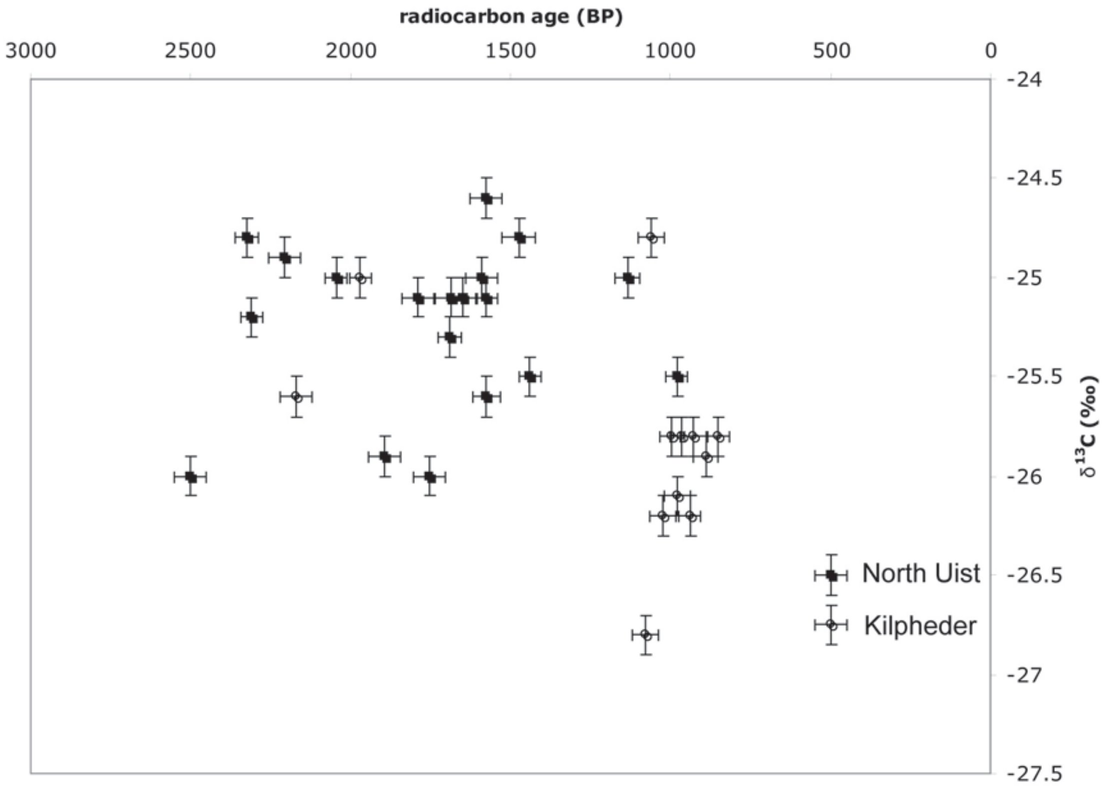

Figure 24.2. Plot of stable carbon isotope values versus radiocarbon ages (BP) from residues on ceramic sherds from Cille Pheadair and North Uist (Campbell et al. 2004)

of use, it was almost completed filled by loose sand (367) from which a carbonized residue (SUERC-4878; 890±40 BP) was submitted.

The south wall of Shed 400 did not survive as it was destroyed by the construction of House 312. A layer of grey sand (209) was laid on the surface of the rectangular pit within which the house was to be built; a carbonized residue (SUERC-4877; 995±40 BP) was dated from this context. The latest floor deposit (204) within House 312 was covered by a series of windblown sands that completely filled up the sunken house trench. An articulated *Bos* vertebra was submitted for dating (SUERC-4872; 880±35 BP) from layer 200, the most extensive of the fill deposits.

House 007 was constructed over the eastern half of House 312. The rectangular hearth was set within stone uprights and located in the centre of the house. Hearth layer 065 (SUERC-4898; 855±40 BP; a single charred *Avena* sp. grain) lay around and partially over hearth layer 064, which provided a single charred grain of *Hordeum vulgare* (SUERC-4897; 785±35 BP). House 007 was modified after its abandonment into a series of small huts. The southwestern hut (Hut 075/031) was a multi-phased structure. The two hearths within Hut 075 each provided samples: from 042, a charred *Hordeum* sp. hulled grain (SUERC-4893; 855±40 BP) and from 011, a charred *Avena* sp grain (SUERC-4892; 805±40 BP).

Stable isotopes

The $\delta^{13}C$ values (Table 24.1) show that the diet of the animals was predominantly terrestrial and therefore will not have affected the radiocarbon age of the samples.

Figure 24.2 shows the $\delta^{13}C$ values of the Cille Pheadair organic residue samples along with those from Iron Age residues from North Uist (Campbell *et al.* 2004). Given that chemical analysis of the Iron Age residues showed no marine component, we believe that the radiocarbon ages from the Cille Pheadair residue samples should be accurate and not affected by any marine offset.

Figure 24.3. (opposite page) Probability distributions of dates from Cille Pheadair: each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. Distributions other than those relating to particular samples correspond to aspects of the model. For example, the distribution Boundary_start is the estimated date when activity at Cille Pheadair started. A question mark (?) indicates that the result has been excluded from the model. The large square brackets down the left-hand side along with the OxCal keywords define the model exactly

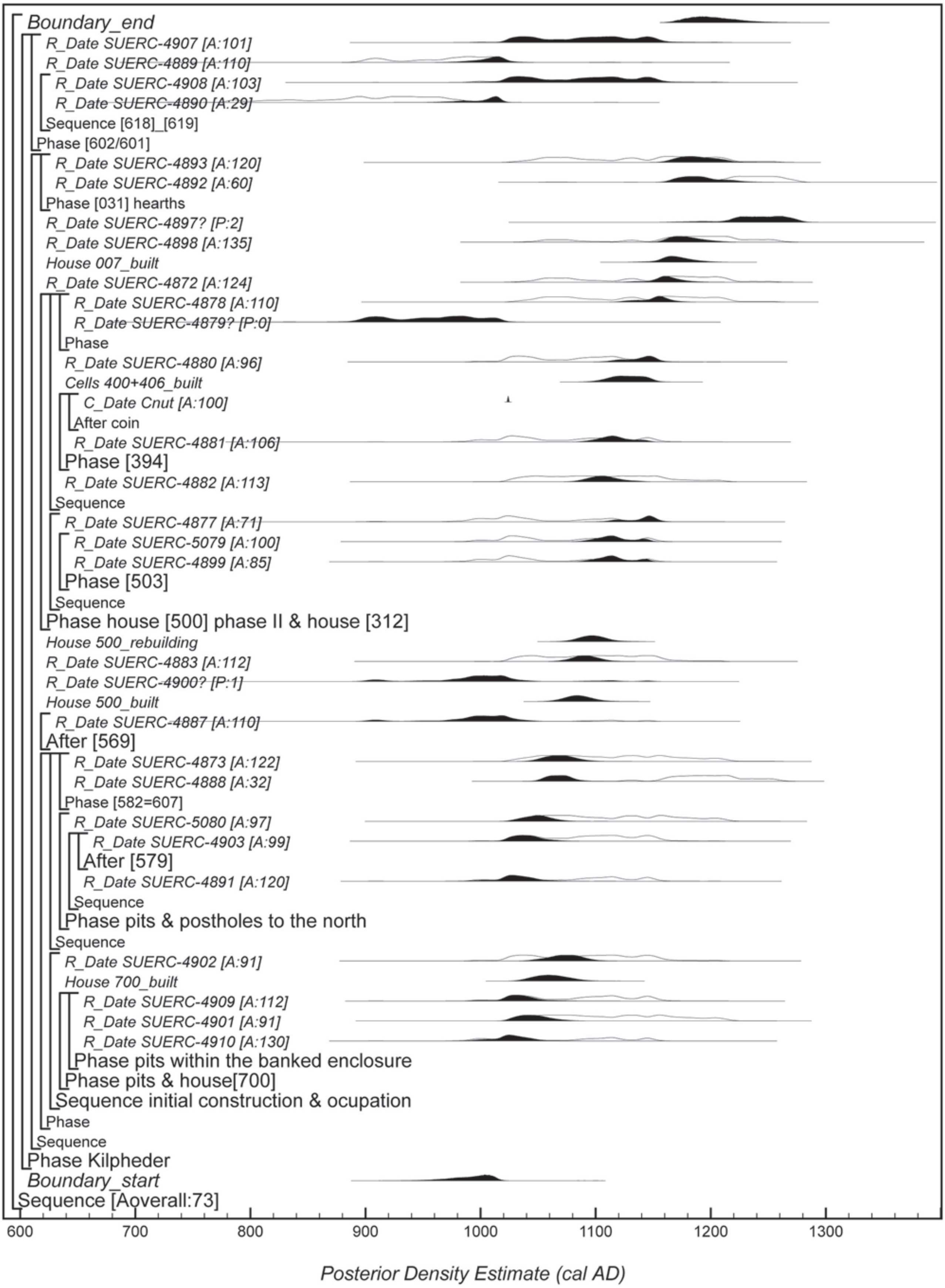
Boundary_end
R_Date SUERC-4907 [A:101]
R_Date SUERC-4889 [A:110]
R_Date SUERC-4908 [A:103]
R_Date SUERC-4890 [A:29]
Sequence [618]_[619]
Phase [602/601]
R_Date SUERC-4893 [A:120]
R_Date SUERC-4892 [A:60]
Phase [031] hearths
R_Date SUERC-4897? [P:2]
R_Date SUERC-4898 [A:135]
House 007_built
R_Date SUERC-4872 [A:124]
R_Date SUERC-4878 [A:110]
R_Date SUERC-4879? [P:0]
Phase
R_Date SUERC-4880 [A:96]
Cells 400+406_built
C_Date Cnut [A:100]
After coin
R_Date SUERC-4881 [A:106]
Phase [394]
R_Date SUERC-4882 [A:113]
Sequence
R_Date SUERC-4877 [A:71]
R_Date SUERC-5079 [A:100]
R_Date SUERC-4899 [A:85]
Phase [503]
Sequence
Phase house [500] phase II & house [312]
House 500_rebuilding
R_Date SUERC-4883 [A:112]
R_Date SUERC-4900? [P:1]
House 500_built
R_Date SUERC-4887 [A:110]
After [569]
R_Date SUERC-4873 [A:122]
R_Date SUERC-4888 [A:32]
Phase [582=607]
R_Date SUERC-5080 [A:97]
R_Date SUERC-4903 [A:99]
After [579]
R_Date SUERC-4891 [A:120]
Sequence
Phase pits & postholes to the north
Sequence
R_Date SUERC-4902 [A:91]
House 700_built
R_Date SUERC-4909 [A:112]
R_Date SUERC-4901 [A:91]
R_Date SUERC-4910 [A:130]
Phase pits within the banked enclosure
Phase pits & house[700]
Sequence initial construction & ocupation
Phase
Sequence
Phase Kilpheder
Boundary_start
Sequence [Aoverall:73]
600
700
800
900
1000
1100
1200
1300
Posterior Density Estimate (cal AD)

Table 24.2. Posterior density estimates for the dates of archaeological events at Cille Pheadair, derived from the model described in Figure 24.6

Event (Figure 24.7)	***Posterior density estimate (95% probability)***	***Posterior density estimate (68% probability)***
start phase 2	*cal AD 940–1025*	*cal AD 975–1020*
end phase 2 & start phase 3	*cal AD 1045–1115*	*cal AD 1060–1095*
end phase 3 & start phase 4	*cal AD 1060–1145*	*cal AD 1080–1115*
end phase 4 & start phase 6_5	*cal AD 1090–1150*	*cal AD 1095–1130*
end phase 6_5 & start phase 7	*cal AD 1100–1160*	*cal AD 1120–1155*
end phase 7 & start phase 8	*cal AD 1130–1215*	*cal AD 1150–1190*
end phase 8	*cal AD 1160–1280*	*cal AD 1170–1230*

Results

The model shown in Figure 24.1 shows poor agreement between the radiocarbon results and stratigraphy (Aoverall=16%) as presented in the previous section.

If the individual index of agreement for a sample falls below 60% (Bronk Ramsey 1995; 1998), the radiocarbon result is regarded as inconsistent with the sample's calendar age if the latter is consistent with the sample's age relative to the other dated samples. This can indicate that the radiocarbon result is a statistical outlier (more than two standard deviations from the sample's true radiocarbon age), but a very low index of agreement can be indicative of the sample's being residual or intrusive (*i.e.* that its calendar age is different to that implied by its stratigraphic position).

Three samples in Figure 24.1 have low individual index of agreement values; SUERC-4897 (A=25%), SUERC-4879 (A=1%) and SUERC-4900 (A=12%). SUERC-4900 comes from the basal deposit (555) of the hearth within House 500. The seed is clearly too old for the context from which it came and therefore might have been incorporated into the hearth from the levelling layer (569) lying immediately below it. The charred seed (SUERC-4897) from hearth deposit 064 in House 007, the last longhouse, would seem to be intrusive and probably originates from activity after the main occupation at Cille Pheadair. Given the sandy nature of the site, the possibility of intrusive material, especially in the upper levels, would seem extremely high.

SUERC-4879 is a carbonized residue from conjoining sherds and as such would suggest that it is not residual, although it seems much too old for its stratigraphic position. The carbonaceous fraction extracted physically and chemically from the inside of the sherd is assumed to represent organic-rich food remains, and thus should date the last use of the vessel in question. Plausible explanations for this discrepancy are that the sherds may be re-deposited – layer 376 was a clean white sand filling Shed 406, and as such may have been imported as a levelling layer – or that, as appreciable amounts of 'old' carbon may remain in the pottery fabric even after firing (Nakamura *et al.* 2001), such 'old' carbon has been incorporated into the residue.

If these three samples (see above) are excluded from the analysis (see model shown in Figure 24.3), the overall index of agreement increases to Aoverall =73%, showing that the radiocarbon results and stratigraphy are in good agreement. This model provides an estimate for the start of activity at Cille Pheadair of *cal AD 945–1020* (*95% probability; Boundary_start*; Figure 24.3) and probably *cal AD 980–1015* (*68% probability*).

House 700 was then constructed in *cal AD 1030–1095* (*95% probability; House 700_built*; Figure 24.4) and probably *cal AD 1040–1075* (*68% probability*). Following demolition of most of House 700, House 500 was constructed in *cal AD 1060–1110* (*95% probability; House 500_built*; Figure 24.4) and probably *cal AD 1070–1100* (*68% probability*). The extensive right-angled, doubled-skinned wall that was subsequently constructed across the north end of House 500 is estimated to have been built in *cal AD 1070–1125* (*95% probability; House 500_rebuilding*; Figure 24.4) and probably *cal AD 1085–1110* (*68% probability*). Following the end of use of House 500 Stage II, Sheds 400 and 406 were constructed in *cal AD 1100–1155* (*95% probability; Cells 400+406 built*; Figure 24.4) and probably *cal AD 1100–1145* (*68% probability*).

The sunken-floored House 312 was built some time after *cal AD 1105–1160* (*95% probability*; SUERC-4877; Figure 24.3) and had gone out of use by *cal AD 1130–1190* (*95% probability*; SUERC-4872; Figure 24.3) when a windblown sand (200) covered floor layer 204. The final longhouse, House 007, is estimated to have been built in *cal AD 1140–1205* (*95% probability; House 007_built*; Figure 24.4) and probably *cal AD 1155–1185* (*68% probability*). Following its abandonment, a pair of huts (Huts 075/031 and 084/026) were constructed inside the walls of the abandoned longhouse. The latest occupation surface in Hut 026 contained a silver short cross cut halfpenny of the reign of King John (dating to *c.* AD 1206); the estimated end of activity of *cal AD 1160–1245* (*95% probability*; *Boundary_end*; Figure 24.3) and probably *cal AD 1175–1220* (*68% probability*) shows good agreement with this independent dating evidence for the end of the occupation sequence.

The length of time over which activity at Cille Pheadair took place is estimated at *145–255 years* (*95%*

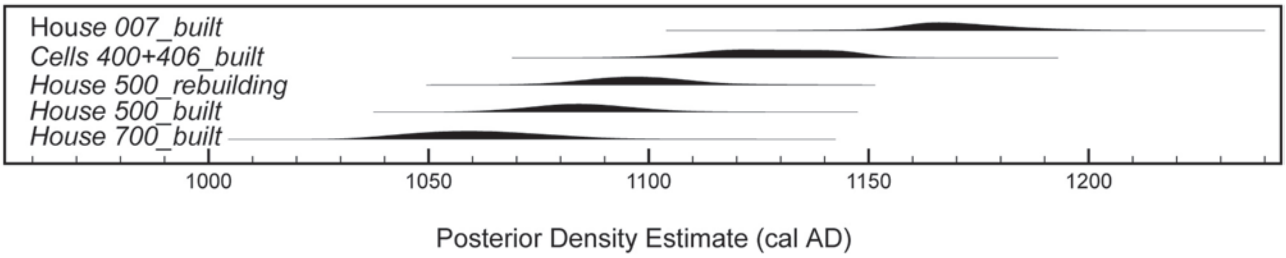

Figure 24.4. Probability distributions for selected events at Cille Pheadair. The distributions are derived from the model shown in Figure 24.3

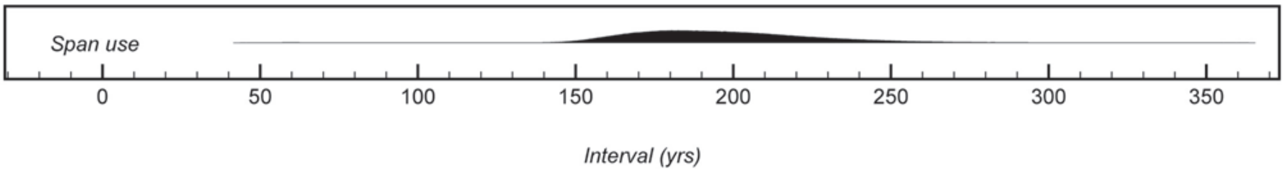

Figure 24.5. Probability distribution showing the number of calendar years during which activity occurred at Cille Pheadair. The distribution is derived from the model shown in Figure 24.3

probability; Figure 24.5) and probably *160–220 years* (*68% probability*).

Sensitivity analysis

An alternative model for the chronology of Cille Pheadair is presented in Figure 24.6. This is based on both the stratigraphic relationships between samples and the archaeological phasing (Sidell *et al.* 2007). This model, which excludes SUERC-4879, SUERC-4897 and SUERC -4900 (see above), has good overall agreement (Aoverall =71%), demonstrating that the prior information included in the analysis is correct. As well as providing estimates for the start and end of activity by assuming that the archaeological phases are abutting, we are able to estimate the end of one phase/start of the following (Buck *et al.* 1992). These estimates are given in Table 24.2 and in Figure 24.7.

24.4. Comparison of radiocarbon dates with typological dating of artefacts

M. Parker Pearson

A few of the finds can be independently dated relatively precisely to particular centuries within the Norse period in terms of their manufacture and, to an extent, their currency (Table 24.3). Of these, the coins are the most chronologically sensitive since dates of manufacture are generally known to within a decade or less.

Whilst the coin of the reign of King John (dating to *c.* AD 1206) falls squarely within the dates for phase 9 in which it was found, the other two coins from Cille Pheadair were likely to have been deposited a century or so after they were minted. A clipped fragment of a possibly tenth-century coin was found in an eleventh-century context (a phase 3 midden deposit associated with the first longhouse, House 700): the construction date for House 700 is *cal AD 1030–1095* (*95% probability*). A coin of Cnut, dating to *c.* AD 1017–1023 was found in a phase 6 context (the base layer of Shed 406): the construction date for the shed is *cal AD 1100–1155* (*95% probability*).

The sherds of the Minety-type ware tripod-pitcher date to the early twelfth century, which accords well with the radiocarbon-dating of the contexts in which the Minety ware fragments were found.

The B3 reindeer-antler comb (SF 1869) and the B4 comb (SF 2132) come from phases with radiocarbon dates that are in agreement with the typological dating (see Chapter 13.1). The second B3 comb (SF 1127) comes from a later phase, and it is noteworthy that this comb was old and worn when it was deposited. Another artefact already old when it was deposited is the pre-Viking Late Iron Age bone pin (SF 2152) which lay on the floor of House 700, dating to after *cal AD 1030–1095* (*95% probability*).

The typological dating of the two copper-alloy Hiberno-Norse stick pins (SF 1868 and SF 2150) does not match their radiocarbon-dated contexts. These copper-alloy stick pins are of a style that in Ireland dates to the late twelfth and early thirteenth centuries. The Cille Pheadair stick pins were found context belonging to phases that ended, at the latest, in *cal AD 1060–1110* (*95% probability*). It is possible that the stick pins could have been deposited very soon after their manufacture (and there is evidence that one of the pins might have been part of a special deposit; see Chapter 3). However, their stratigraphic context is very secure and these Cille Pheadair pins therefore push the chronological range of the type earlier than they are so far dated in Ireland.

A third artefact which has a typological date range that is too late for what appears to be its context of deposition is the thirteenth-century copper-alloy annular brooch (SF 1453) found in a midden layer cut by the gully of House 007, whose construction dates to *cal AD 1140–1205* (*95%

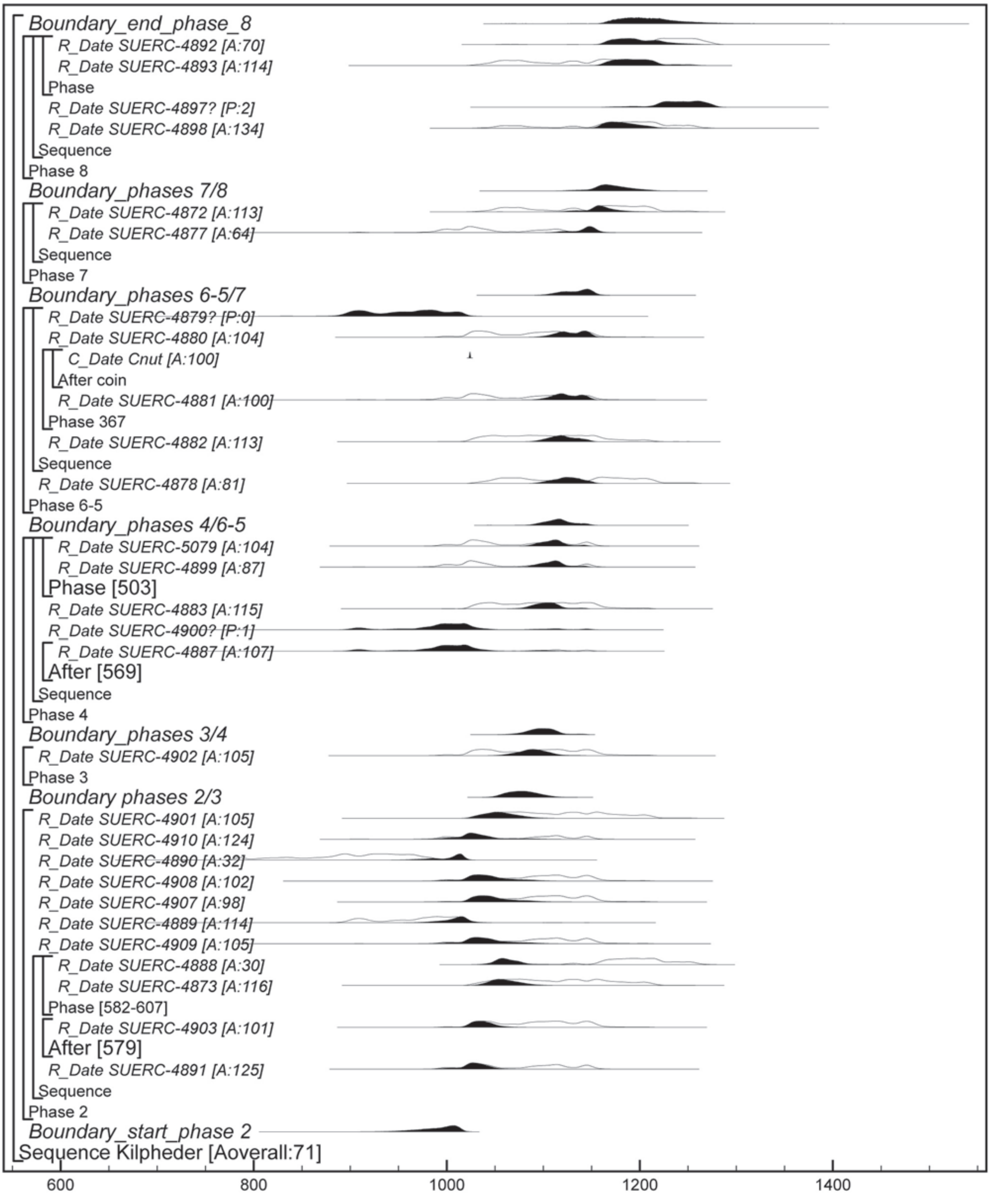

Figure 24.6. Probability distributions of dates from Cille Pheadair following an alternative model: each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. Distributions other than those relating to particular samples correspond to aspects of the model. For example, the distribution Boundary_start_phase_2 is the estimated date when activity at Cille Pheadair started. A question mark (?) indicates that the result has been excluded from the model. The large square brackets down the left-hand side along with the OxCal keywords define the model exactly

Table 24.3. Comparisons of typologically dated artefacts and their radiocarbon-dated contexts

SF no.	Artefact type	Phase	Typological date	Start of phase (at 95% probability)	Start of subsequent phase (at 95% probability)
1868	Copper-alloy Hiberno-Norse stick pin	1?/2?/3?	*c.* AD 1150–1250	*945–1020*	*1060–1110*
1869	Reindeer antler comb	1?/2?/3?	*c.* AD 950–1050	*945–1020*	*1060–1110*
1809	Lead bar/weight	2	*c.* AD 900–1100	*945–1020*	*1030–1095*
2132	Antler comb	2	*c.* AD 950–1050	*945–1020*	*1030–1095*
6308 (sample no.)	Coin fragment	3	*c.* AD 900–1000	*1030–1095*	*1060–1110*
1127	Reindeer antler comb	3	*c.* AD 950–1050	*1030–1095*	*1060–1110*
2150	Copper-alloy Hiberno-Norse stick pin	3	*c.* AD 1150–1250	*1030–1095*	*1060–1110*
2152	Pictish-style pin	3	*c.* AD 600–790	*1030–1095*	*1060–1110*
context 544 *etc.*	Minety-type tripod pitcher	4	*c.* AD 1100–1150	*1060–1110*	*1070–1125*
1004	Spherical weight	5	*c.* AD 1000–1250	*1070–1125*	*1100–1155*
1781	Bone pin with Ringerike-style motif	5	*c.* AD 1000–1100	*1070–1125*	*1100–1155*
1672	Coin of Cnut	6	*c.* AD 1017–1023	*1100–1155*	*1105–1160*
1453	Copper-alloy annular brooch	7	*c.* AD 1200–1300	*1105–1160*	*1130–1190* (end of phase 7)
1521	Copper-alloy spiral terminal	7	*c.* AD 950–1050	*1105–1160*	*1130–1190* (end of phase 7)
1031	Coin of King John	9	*c.* AD 1206	*1160–1245* (end of activity)	*1160–1245*

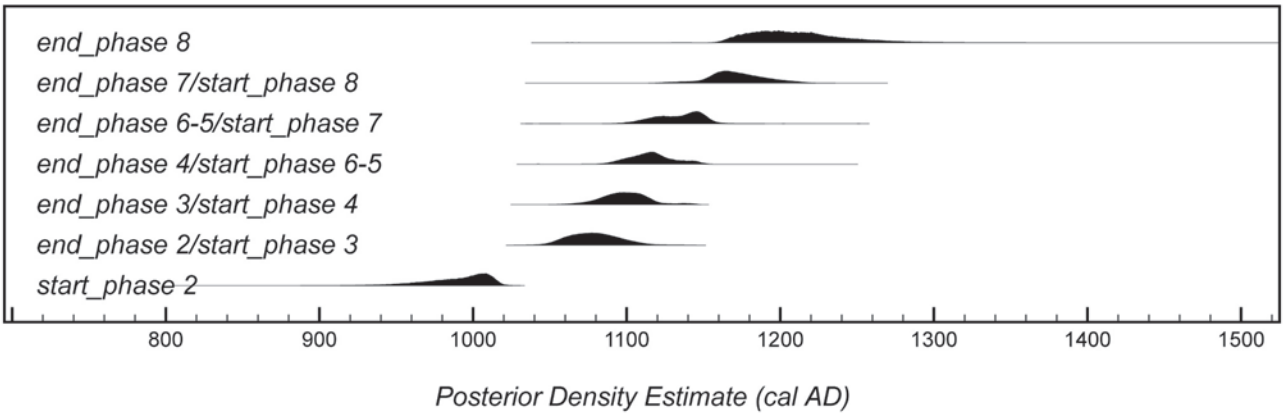

Figure 24.7. Probability distributions for beginnings and endings of archaeological 'phases' at Cille Pheadair. The distributions are derived from the model shown in Figure 24.6

probability). Either it is a very early brooch of its type or it has worked its way downwards through loose sand from a later ground surface associated with the final years of activity at Cille Pheadair.

Two other typologically dateable artefacts – a bone pin engraved with a Ringerike-style union knot (SF 1781) and a copper-alloy spiral terminal (SF 1521) – were found in the site's later phases (in phases 5 and 7). The former's typological dating coincides with the radiocarbon-dating of its phase. In contrast, the spiral terminal is likely to have been old by the time of deposition because its style was probably long out of fashion by the time that House 312 was built.

Despite the anomalous stick pins, the typologically dated finds from Cille Pheadair show a good agreement with the radiocarbon framework. Interestingly, two of the coins, one bone pin, one comb and the copper-alloy spiral terminal are likely to have been deposited long after they were manufactured.

25 The Cille Pheadair farmstead in its context

B.E. Crawford and M. Parker Pearson

25.1 Politics and power in the Western Isles *c*. AD 1000–1300: the documentary evidence

B.E. Crawford

The phases of occupation of the farmstead excavated at Cille Pheadair span the whole period of time during which the Western Isles were part of the Scandinavian world. South Uist was in the kingdom of the Isles, ruled from the Isle of Man, and the islanders also lay under the remoter authority of the kings of Norway and the archbishops of Trondheim (from 1152/3).[1]

Although it is impossible to know how the people who lived at the settlement responded to the political and cultural ties of the wider world around them, or to what extent they were part of that wider world, it is important to be aware of the political and ecclesiastical networks, which can help to give a context to the material circumstances of this simple farmstead on the extreme western fringe of medieval Europe.

Such a coastal settlement was not, however, isolated and the finds from the excavation show just how the wider maritime network contributed to the economic conditions that have been unearthed at the farmstead at Cille Pheadair. It lay on a sea-route of immense significance in the history of the Viking raiding and trading world, and it lay beside – and must have been a part of – the west coast routeway which stretched from Dublin to Orkney, and from Shetland to Norway (Figure 25.1; Parker Pearson *et al*. 2004a: 235).

Even though the farmers at Cille Pheadair did not have large boats, they were easily in touch with those who plyed this route and they would have had no difficulty in accessing material goods and news and ideas from those who moved up and down the sea-lanes of the Hebrides. They also would have been part of the Hebridean Norse-Gaelic network, which stretched north to Harris and Lewis and south to Barra, Iona, Islay and Kintyre. This was part of what has been designated the 'insular Viking zone' comprising primarily Ireland, Wales and the Isle of Man, 'but also the Scottish Western Isles, and at times, the Northern Isles' (Etchingham 2001: 145).

The settlement phase

This 'insular Viking zone' was a complex maritime world where the Norsemen met Late Iron Age culture and became absorbed in political and military struggles for supremacy, adding their own North Sea and Scandinavian element to the indigenous way of life. The historical evidence for what was happening is fragmentary and comes from Irish, Welsh and Icelandic sources, difficult to interpret and even more difficult to reconcile (Hudson 2005: 10–15, 61, 75; Downham 2007: 11; McDonald 2007: 39). The Hebridean element is the sparsest, for there is little documentary evidence from the Hebrides dating to the period 1000–1200, until the Chronicle of Man starts to record the doings of the kings of Man in the late eleventh century (Hudson 2005: 9; Broderick 1976; Williams 2015).

Before that moment, our knowledge of the situation in the islands is drawn from the sagas about the earls of Orkney, and the Irish and Welsh annals about the Celto-Norse dynasties which dominated Ireland, most importantly Dublin, and the Isles. The priorities of these sources are the deeds of the earls and the rulers of the Irish kingdoms, so information about the Hebrides is mentioned only if and when the main actors in the area had reason to sail through them en route north or south, or made attempts to control the archipelago.

In some ways this insular world had a maritime unity, which, despite the great distance from north Lewis to the southern tip of Kintyre (225 miles; 362km; see Figure 25.10), was quickly accessible to people with effective shipping. In other respects, however, it was easily divided between widely-differing zones of influence, so that the northern Hebrides had more in common with northern Scotland and the Northern Isles, while the southern Hebrides were – and historically had been – a part of Argyll, and very open to influence from Ireland.

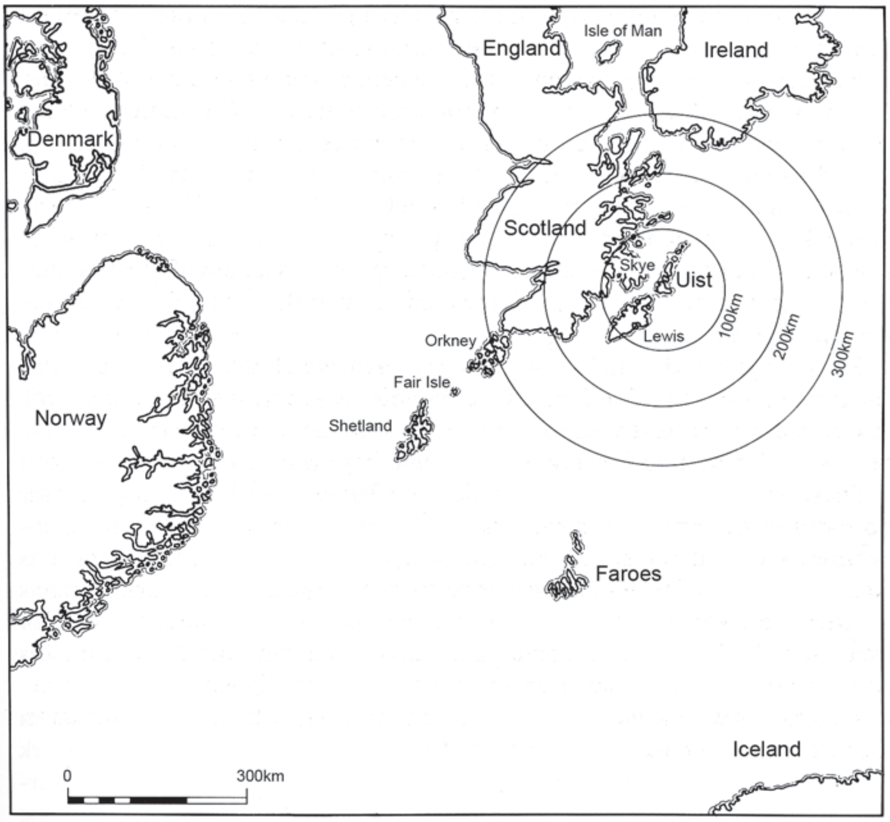

Figure 25.1. South Uist's position within the North Atlantic (from Armit 1996; drawn by Alan Braby)

It is not particularly surprising that the two halves of the Hebrides divided in the mid-twelfth century, when the sons of Somerled established their power over the mainland territory of south Argyll and the islands of the Inner Hebrides south of Ardnamurchan (Duncan and Brown 1956–7: McDonald 2015). In any case, islands often function as discrete, bounded units, perhaps under the dominance of a family or clan, and acting independently in line with their own insular priorities; the Hebrides at the time provide examples of island communities with a political and economic relationship with the wider world in which the islanders theoretically acknowledged the authority of a powerful overlord or chieftain.[2]

For the Vikings these coasts and islands were ideal pirate lairs, and individual leaders of boatloads of Norwegian raiders would have found a familiar maritime landscape which they could take over and utilize for their exploitative purposes, and which provided them with security and status (Crawford 1987: 46).

The historical evidence for this process is almost totally non-existent, except for generalized statements such as that by Prudentius of Troyes who wrote under the year 847 'the [Irish] Scots, after being attacked by the Northmen for very many years, were rendered tributary; and [the Northmen] took possession, without resistance, of the islands that lie all around, and dwelt there' (Anderson 1922 vol. I: 277). The later Icelandic sagas have fuller details about individuals who were remembered from this early period of raiding in the west, the most famous of whom was Ketil *flat-nefr* (Flat-Nose). He is credited in *Landnámabók* with conquering the Hebrides, and with marrying his daughter to Olaf, king of Dublin (Anderson 1922 vol. I: 309, 311–13; Eldjarn 1984: 9–10; Crawford 1987: 48; Woolf 2007: 295–7).

It has been suggested recently that a process of division of Dál Riata might have taken place between these Norse incomers and the native Scots, at least in the southern Hebrides (Crawford 1987: 96–128). The pattern of place-names tells us that Norse domination was much heavier north of Ardnamurchan (Woolf 2003: 95; see Lane and Campbell 2000: 31–7 for an overview of the kingdom of Dál Riata). Or it may be that the Gaelic revival was less complete in the Outer Hebrides, where the actual township names are predominantly Norse, as in South Uist (Parker Pearson *et al*. 2004a: 126–7; Parker Pearson 2012c: 30–1).

The archaeological evidence is, of course, what we can place greater reliance on, particularly the incidence of pagan graves, some of which in the Hebrides suggest the existence of a rich warrior elite (Crawford 1987: 126–7; Graham-Campbell and Batey 1998: 151–2). What have been called the 'relatively rich' graves on Colonsay and Oronsay (as well as those on Eigg) (Eldjarn 1984: 8) surely supply material evidence of the final resting-places of Norse settlers – men and women – who had taken possession of these islands: islands which are so strategically located for control of the sea-routes between the northern Hebrides and the Irish Sea, and which provided Norse incomers with ideal locations for new settlements in the early Viking Age.[3]

However, as the distribution maps of pagan graves show, recorded pagan burials – particularly ones which are richly equipped – are rather fewer in number in the Outer

Hebrides (Crawford 1987: fig. 31; Graham-Campbell and Batey 1998: fig. 7.1), and 'frustratingly fragmentary' from the Uists (*ibid*.: 79). The cluster of smaller islands at the southern end of the chain have produced more evidence of ninth-century pagan burials, replicating the pattern already referred to of insular locations with good strategic connections as favoured settlement places (Campbell and Batey 1998: 82–3). The low-lying Uists, with their rugged east coast and western sandy machair strip, might not have been so attractive to the earliest settlers – a possibility which is reinforced by the dating of the Cille Pheadair and Bornais settlements to the very end of the Viking period, with most of the life of the settlements falling in the Late Norse period.

The tenth century

Moving from a period when individuals and their followings seized and dominated islands in what must have been an initial inchoate phase, we have the growth of larger dynastic groupings with leaders who bear the title of 'lord' or 'king' of the Isles. The first individual given the title *rí Innse Gall* ('king of the Isles of Foreigners', *i.e*. the Norse) appears in the Irish and Welsh sources in the late tenth century. Godfrey/Gothfrith Haraldsson (Gofraid Mac Arallt) 'whose sphere of influence seems to have encompassed Man and the Isles' (McDonald 1997: 31) is recorded as ravaging Anglesey and Dyfed in the 970s and 980s. He probably shared power over the Hebrides with his brother Maccus, who is called 'king of many islands' when he joined with other rulers from the north to meet with the Anglo-Saxon King Edgar at Chester in 973 (Downham 2007: 124–6).[4]

Who these Haraldssons where and where they came from does not concern us especially, but their evident links with Ireland are possibly significant. In 974 one of them raided Scattery island in the Shannon and carried off into captivity Ívarr, king of Limerick (Etchingham 2001: 172; Hudson 2005: 59). This suggests that the Haraldssons might have had connections with Limerick and that their father might have been the Haraldr, king of Limerick, who died in 940, apparently a son of Sigtrygg, grandson of Ívarr who had restored Viking control of Dublin in 917 (Downham 2007: 192).

These are all scions of the *Uí Ímair* (sons of Ívarr) dynasty that founded Dublin in the mid-ninth century and ruled the whole of the Irish Sea region and Argyll, dominating the sea-lanes through the Hebrides (Downham 2007: ch. 1). Individual members of this dynasty sometimes had complete authority throughout the area, which in the tenth century included northern England and the city of York; but more usually the different insular parts were ruled by a 'brood' of 'cousinly princes' who squabbled among themselves for the overkingship, with a 'natural tendency to fission' (Woolf 2003: 96).

If Godfrey and Maccus Haraldsson were indeed as intimately bound in with the most powerful Norse dynasties in Ireland as this theory suggests – making them nephews of Olaf Cuaran, king of Dublin – then their period of dominance as kings of the lsles would have drawn the Hebrides into the Irish Sea world. What effects would this have had on a newly founded small farming settlement on the west coast of South Uist? We can imagine that male members of the family might have been tempted (or compelled) to join the ships' crews of their nearest military leader, who was himself expected to participate in the raiding expeditions of the Haraldssons, whose ability to dominate the Hebrides and suppress any rivals would have given them the right to call on the loyalty of the communities in the islands.

Although only a fragment of a tenth-century coin was found in the excavations of the farmstead, the evidence of silver hoards found throughout the Northern and Western Isles reveals the sort of wealth that could be amassed at this time by the Norse settler communities (silver hoards of brooches, coins and hacksilver are indisputably associated with the economic activity of Norse raiders and traders). It has to be said that fewer hoards have been found in the Outer Hebrides than in the Inner Hebrides or Orkney, and all of them pale into insignificance compared with the remarkable number of hoards from the Isle of Man (Bornholdt Collins 2015: 411, Appendix 1; Crawford 1987: fig. 41; Graham-Campbell and Batey 1998: fig. 12.1). Apart from two hoards from Lewis, there are two unlocated hoards from the southern group of islands, one from North Uist.

The numismatists' analysis of the origin of coins found in such hoards can reveal a great deal about the economic contacts between Norse traders/raiders and the different parts of northern Europe (at least those parts where coins were minted). After the decline of Arabic coins in the mid-tenth century, Anglo-Saxon ones predominate, as for instance in the Storr Rock hoard from Skye, buried *c*. 935–40 (also including a few Kufic dirhams). The mints from which the Anglo-Saxon coins came were half southern and half northern English – York and Lincoln in particular. The later tenth-century hoard found on Iona included 345 Anglo-Saxon coins, but also three deniers from Normandy, pointing to some contacts with the Dano-Norse duchy (Graham-Campbell and Batey 1998: 233).

Orcadian domination

The Iona hoard dated to *c*. 986 coincides with the report in the Irish Annals of a Christmas-time attack on the monastic community on the island, and there is further evidence of much disruption in the Irish Sea zone in the later tenth century. It is likely that there was a challenge to the Haraldssons, and that their control in the islands became insecure, perhaps a result of the extension of the earl of Orkney's influence in the area (Etchingham 2001: 179). Godfrey Haraldsson was killed in Dál Riata in 989 and although the evidence is circumstantial, it points towards Earl Sigurd Hlodversson of Orkney, one of the most powerful of the northern earls, expanding his authority southwards over the Hebrides and filling the vacuum (Crawford 1987: 66–7; 2013: 119–20). The dating of the

first phase of activity at Cille Pheadair suggests that it was during this period of Orcadian control that the farmstead was founded.

Earl Sigurd Hlodversson ('the Stout') was certainly deeply involved in the politics of Dublin and the coalition against Brian Boru, King of Munster. Sigurd's mother was Edna (Eithne), the daughter of an Irish king, and he himself had ambitions in Ireland. The fact, attested in Irish sources and in the sagas, that Earl Sigurd fought – and died – at the battle of Clontarf in 1014 tells us that he was thoroughly committed to gaining power in Ireland (Anderson 1922 vol. I: 534–41; Crawford 2013: 125–8).

The band of warriors who were with Earl Sigurd at Clontarf is said, in a late Irish source, to have included men not only from Orkney and Shetland, but also from Man and the Hebrides – specifically citing the islands of Skye and Lewis, as well as Kintyre and Argyll (Anderson 1922 vol. I: 536). This gives us good evidence that he had authority to call up warriors from the Hebrides, and there is further evidence, although from late sagas, that he took taxes from Man and ruled the Hebrides through a tributary earl called Gilli (Crawford 2013: 125).

It may also be the case that the assessment units called ouncelands were imposed on the Hebrides while they lay under the authority of Earl Sigurd (Crawford 2013: 88–91; Williams 2015: 477–8). There is evidence from place-names, and late historical sources, that these units existed in North and South Uist and on Barra.[5]

There seems little doubt that Orkney overlordship extended over at least the northern and Outer Hebrides in the late tenth century and was revived and probably strengthened by Sigurd's son Thorfinn in the 1030s until his death *c*. 1060 (see below). The effects of such change in lordship are, however, not easy to estimate. If there had been a violent struggle to take power, then it is possible that those killed in the process would have been replaced by earldom men from northern Scotland or the Northern Isles. However, the one piece of information that we have about a local chieftain in the islands, Jarl Gilli in either Coll or Colonsay, in *Njal's Saga* (Magnusson and Palsson 1960: ch. 89: 154) gives an indication that there was a process of bonding with the native rulers, for Earl Sigurd is said to have married his sister Nereid to Jarl Gilli. Despite his Celtic name, Gilli is given the Norse title of *jarl*, and might well have been as 'hybrid' as Earl Sigurd with his Irish mother. The issues of Norse ethnicity are much discussed these days, and it is fully recognized how problematic is the 'relationship between ethnicity, material culture and language' (Parker Pearson *et al*. 2004b: 236–7).

However, there is no doubting that there was a tension between the world of the native inhabitants of Late Iron Age Britain and the Norse world, and that the Hebrides were on a cusp between these two worlds. In the hierarchy of settlement and power, we move from the farming family (or families) settled on the machair at Cille Pheadair, to the local chieftains such as Jarl Gilli, to the more powerful overlords to whom such local chieftains had to submit (such as the kings of Man and the Isles, or the earls of Orkney) – and at the top of the pyramid the national rulers, seeking to extend a kingdom's authority out beyond the national frontiers, territorial or maritime.

In this category we have primarily the Norwegian rulers to consider, for the Irish kingdoms were too fragmented to extend power to the islands, even though the rulers of Dublin were eager to exercise their authority over Man and the Isles (McDonald 1997: 32): the Scottish kings were not yet powerful enough within their heartlands to think, or care, about the maritime world in the west.

The eleventh century: Danish and Norwegian ambitions

The kings of Norway were able and willing to consider the settlements in the west as integral parts of their kingdom when they were strong enough to leave their own territory and embark on expeditions west to enforce their authority and demand submission. This happened once they had unified the disparate parts of the west coast of Norway and eastern provinces under their authority in the late tenth and early eleventh centuries.

During the same period Cnut Sweinsson, conqueror of Anglo-Saxon England in 1016 and king of Denmark (from 1020) and Norway (from 1028), also seems to have had ambitions to dominate Dublin and the Irish Sea zone, as well probably as the Isles, once he had brought Norway within his North Sea empire in 1028 (Hudson 1992: 350–60; Etchingham 2001: 161–2). He could do this by supporting one of the candidates for power in the region, and clear evidence from the *Anglo-Saxon Chronicle* shows his involvement in the internal situation in the Hebrides when 'Iehmarc' (Echmarcach mac Ragnaill or Ronaldsson)[6] is mentioned as one of three northern kings who submitted to Cnut in 1031 (Swanton 1996: 157, 159). Cnut was presumably supporting a Hebridean dynasty in opposition to Earl Thorfinn of Orkney, who as an earl of King Olaf of Norway was unlikely to become a man of the Danish king.[7]

Whatever Cnut's ambitions in Scotland and the Hebrides, he did not have long to see the results for he was dead within three years, and his successors were never able to sustain such imperialist policies. Earl Thorfinn was determined to move in to the Hebrides in the following decades and, with the support first of his nephew Rognvald Brusisson and then of Kalv Arnesson, a relative by marriage, he maintained and probably strengthened Orcadian control (Crawford 2013: 138–9).

This was not without opposition, for even the *Orkneyinga Saga* admits that 'at that time [*c*. 1035] Thorfinn was having a great deal of trouble with the Hebrideans and the Irish and needed reinforcements badly' (Palsson and Edwards 1978: ch. 22: 57). But after the break-down of relations with Rognvald we are told that Thorfinn 'sent men to the Hebrides and south to Scotland to gather forces' (*ibid.*: 61), and there are other statements telling us that the Hebrides provided him with a source of fighting-men, and that Thorfinn had the authority to call on the Hebrideans for service. He sent his cousin Kalv to the Hebrides 'to

make sure of his authority there' (Palsson and Edwards 1978: ch. 27).

No doubt the willingness of the Hebrideans to serve in the following of the earl would have depended on the rewards they earned in the form of booty or hand-outs. Thorfinn was able to attract Scots and Irish 'as well as a good many from all over the Hebrides' when he raided England in the reign of Harthacnut (1040–2) (Palsson and Edwards 1978: ch. 24: 60). Raids like this could result in surprising items of wealth coming into households like Cille Pheadair, such as the gold strip found in the midden outside the stone longhouse House 700 (phase 3).[8] Unfortunately the saga is very unspecific as to where such raiding occurred, simply saying 'far and wide throughout England', or by Arnorr (Earl Thorfinn's skald) 'south of Man' (*ibid.*: ch. 24).

The *Orkneyinga Saga* (chap. 34) is very full of Thorfinn's conquests because the writer is lauding his rule, and perhaps this explains why there is no mention in the saga of a raid westwards by the son of the king of Norway in 1058 (Woolf 2007: 266) This was Magnus, son of Harald Harðraða, and his aim may have been to undermine the regime of Edward the Confessor (Etchingham 2001: 152–4) at a time when the succession to the English throne was a matter of deep concern to many ambitious Anglo-Scandinavian claimants.[9]

The Annals of Tigernach reported 'A fleet [was led] by the son of the king of Norway (*Lochlainn*), with the Foreigners of the Orkneys (*Indsi Orcc*) and of the Hebrides (*Indsi Gall*) and of Dublin, in order to take the kingdom of England, but God permitted it not' (Anderson 1922 vol. II: 1; Woolf 2007: 266). It is worth noting that the Foreigners of the Orkneys and of the Hebrides are seen in the same terms by the annalist. This raiding venture was probably linking up with the son of the earl of Mercia who had been in exile in Ireland and led an attack in conjunction with the king of Gwynedd on western England three years earlier, and having succeeded his father to Mercia was exiled once again in 1058 (Etchingham 2001: 152).

The dramatic events of the year 1066 were fateful for the Orkneys but not for the Hebrides, as King Harald Harðraða's expedition, accompanied by the new earls Paul and Erlend Thorfinnsson, was launched from the Orkney islands down the east coast of England. The next phase of Norwegian royal ambition to have an effect, and a powerful one, on the Hebrides was at the very end of the eleventh century. In 1098 King Magnus Olafsson *berfættr* ('Barelegs') launched two expeditions aiming to reassert Norwegian authority over the Northern and the Western Isles, and to use the Isle of Man as a base for controlling the lands around the Irish Sea (Power 1986: 107–32; 2015: 30–1). The impact first on Orkney reveals his ruthless intentions when he sent the two earls Paul and Erlend to Norway and installed his own son Sigurd, who was still a child, over the islands, with councillors (Palsson and Edwards 1978: ch. 39).[10]

The king's skald Bjorn Cripplehand left graphic descriptions of the destruction then wrought throughout the Hebrides which are incorporated into King Magnus' own saga, as written by Snorri Sturluson.[11] Among the litany of islands on the receiving end of the great war-raid, Lewis was first named where

> 'to Hills and rocks the people fly, Fearing all shelter but the sky'[12]

while

> 'in Uist the king deep crimson made
> the lightning of his glancing blade;
> the peasant lost both land and life
> who dared to bide the Norseman's strife'[13]

Here we have the actual mention of the name Uist (possibly the first recorded use of the name; Jennings and Kruse 2009: 81), and this skaldic poem is the nearest one can get to historical evidence for devastation of farmsteads like Cille Pheadair. Could the reduction in the size of the farmstead at the end of phase 4 be a possible result of Magnus Barelegs' 1098 raid?

This is all one hears about Norwegian activity in the Outer Hebrides, and it would seem clear that Magnus' action was a deliberate campaign to cow the islanders into submission.[14] At the same time it might have been his intention to force the issue over the exact boundary between his overlordship and that of the Scots king. When he returned to Scotland from Anglesey, his saga says that men went between him and the Scots king 'and a peace was made between them' (according to the *Orkneyinga Saga* ch. 41, it was the king of Scots [Malcolm *recte* Edgar] who sent messengers to offer a settlement). Norwegian authority was thereafter restricted to the islands and it is said that 'King Magnus was all winter in the southern isles', during which period his men went all over the fjords, rowing within and around all islands 'and took possession for the king of Norway of all the islands west of Scotland' (Laing 1964: ch. xii; *Magnus Barefoot's Saga* p. 264). The Scottish kingdom thereafter was recognized as containing all the mainland territories, some of which (the western coastal regions along with the northern mainland) had been settled by Norse speakers (Crawford 1987: 25).

However, this arrangement must have suited Magnus' strategy, and his activity south of the Hebrides tells us that his sights were set on dominating the Irish Sea zone: he took over the Isle of Man, intervened in Anglesey, and influenced the outcome of Gruffyd ap Cynan's struggle with the Normans. Above all, he wanted to control the Viking trading centres in Ireland, maybe even aspiring to overlordship of all Ireland. At least he contracted a prestigious marriage alliance for his son Sigurd with the daughter of Muirchertach Ua Briain, then the most powerful king in Ireland (Etchingham 2001: 14; Beuermann 2002: 44).

This comprised ambitious intervention in the whole insular Viking zone: we do not know how the situation might have developed if Magnus had not got himself killed in Ulster on his second expedition of 1102. He had returned there because of Muirchertach's interference in the Kingdom of the Isles (Woolf 2004: 101). In the aftermath

of his death, there was uncertainty about the succession in the kingdom of Norway: Sigurd Magnusson returned to Norway to claim power, and the Hebrides were once more drawn into the Irish Sea world.

The twelfth century

Those who built the large stone longhouse House 312 (phase 7) at Cille Pheadair in the post-Magnus Barelegs' era were living in a different political world, dominated by developments in the Isle of Man. Although the Hebrides were now officially under Norwegian authority, there is little evidence of any interest or interference in the islands' affairs by twelfth-century Norwegian rulers or their subordinates, although presumably some officials were appointed to have charge of any royal interests in the area.[15]

As will be seen, the creation of the archbishopric of Trondheim in 1152–3 and the incorporation within it of the diocese of the Hebrides (Sodor/*Suðreyar*) were a means of strengthening Norwegian authority in the area. But Magnus *bærfot*'s successors had, in general, other political priorities – such as civil war – to occupy them and were in no position to exert pressure on the kings of Man. The visit of Godred Olafsson, son of King Godred of Man, to Norway in 1152–3 was probably prompted by pressures within the Irish Sea zone, or within the kingdom itself, caused by the rise of Somerled (Beuermann 2002: 81–2).

So, the twelfth century was a time when external influences in the Hebrides became less important, and political change was engendered from within the islands. First of all there was the growth of the political structures in Man itself. The dynasty of Godred Crovan was 'a mixed breed of Norse-Celtic adventurers' (Crawford 2015: 223), whose experience of political authority had been gained in Ireland, Scotland and sometimes England. The language of the court and culture included both Norse and Irish elements, although the exact mix of the two has been a cause of much dispute in the past. Then there was an Anglo-Norman cultural element, which Olaf son of Godred would have assimilated at the court of Henry I of England while he was resident there; it was probably his experience at Henry's court which influenced Olaf into later regularizing the bishopric in his kingdom and fostering monastic communities in Man itself (McDonald 1997: 207–18).

We cannot expect the kings' modernizing tendencies to have had much effect in the outer fringes of their island dominion, and in truth we have absolutely no evidence of the effects of their rule in the Outer Hebrides. Speculation about 'feudalization' (Crawford 2015: 231) is really not relevant to the landholding situation in the Uists. We can guess that there might have been mechanisms for collecting taxes or renders, and we know from later evidence that the Hebridean islands were grouped into four for judicial representation at the annual legal assembly at Tynwald in the Isle of Man (Megaw and Megaw 1950: 167). There must have been more local judicial assemblies at which economic and military obligations would have been assessed, but only the Council of the Isles, held at Finlaggan, Islay, is historically recorded (Crawford 1987: 289; Caldwell 2003: 31, 38, 50–1; Macniven 2015: 263–4; Sanmark 2017: 202–4).

Perhaps the only suggestion one can make with some confidence is that the cultural situation in the Outer Hebrides is likely to have been more conservative than anywhere else in the Manx kingdom. The place-name evidence tells plainly of the more lasting nature of the Norse linguistic strain in the Outer Isles than in the Inner Hebrides (Oftedal 1955; Jennings 1996; Stahl 2000; Macniven 2015). The Norse language possibly survived in the Outer Hebrides longer, although the evidence from Cille Pheadair tells of a definite decline in the material evidence for contact with the Scandinavian north from phase 4 onwards (beginning *cal AD 1060–1110*).

This putative distinction between the Outer and Inner Hebrides was, however, not maintained with the rise of Somerled macGillebrigte (ON *sumarliði* = summer warrior) and the dominance of his family in the last century of the Norwegian period. Somerled has traditionally been seen as the great Gaelic lord leading a native revival (McDonald 1997: 57), but it would be very difficult to say what his priorities were in ethnic terms, although his deadly rivalry with the King of Man is the dominant feature of his rise and fall.

After the battle of the Epiphany in 1156 between Godred and Somerled, the Kingdom of the Isles was divided between them, which the Manx chronicler sees as the cause of the ruination, or break-up, of the kingdom (Broderick 1996: f. 37v). It certainly resulted in the difficult situation whereby some of the Outer Isles were retained by the kings of Man but separated from them by treacherous waters, with the chieftaincy of Somerled inserted between them in the southern Hebrides. No historian of this period is confident in saying exactly how the Outer Hebrides were divided between the kings of Man and the Lords (or sometimes Kings) of the Isles.

Following the death of Somerled in 1164, Godred re-established himself in the Outer Hebrides but then the Uists, Benbecula and Barra appear to have become part of the territory of Angus, third son of Somerled, and, on his death in 1210, the Lordship of Garmoran passed to his nephew Ruari, second son of Ranald, from whom the Lords of Garmoran descended (McDonald 1997: 70, 80).

The Uists, Benbecula and Barra were therefore drawn into the Inner Hebridean world and linked as a maritime lordship with Rum, Eigg, and the mainland territories of Knoydart and Moidart. The consequences of this would seem inevitably to have been a 'Gaelicization' of the remoter communities on the western fringe.

One twelfth-century development which should have strengthened the Norwegian connection was the establishment of the archdiocese of Nidaros (Trondheim) in 1152–3, in which the diocese of the Hebrides (*Suðreyar)* was included (Beuermann 2002: 62–8). The history of the bishopric before this date points to its subjection to first Canterbury and then York and there was the possibility

that it might have come under the new archbishopric of Dublin, founded in 1151/2. Indeed it has been argued that Godred Olafsson's rather surprising visit to Norway in 1152 (the first evidence of any contact between Norway and the kingdom of Man since 1103), when the Manx Chronicler says that he did homage to King Inge (Broderick 1996: f.36r), might have been prompted by his desire to take his kingdom under the Norwegian ecclesiastical cloak rather than be subjected to Dublin (Beuermann 2002: 68). It certainly indicates that King Godred was looking for a counter-balance to Irish influence within his kingdom.[16]

The complex history of the bishopric in the next century does not suggest that the Norwegian church played a very active role in the choice of bishops (Woolf 2003: 174–7). Nor can we imagine that the bishops with their see at Peel played a very active role in the outermost corners of their diocese, apart from occasional visitations. Different regions in the diocese, with their own distinctive cultural traditions, probably had their own head churches (*ibid*.: 180), where the bishops would call in from time to time. But these were all in the other divisions of the Hebrides: Snizort in Skye (Thomas 2014), Rodel in Harris, Kingarth in Bute (Márkus 2012: 139–40) and, of course, Iona), so there is no obvious ecclesiastical centre in Garmoran from where parochial care in the Uists could have been organized.

The number of churches recorded, or known from place-names, in South Uist does, however, certainly indicate that parochial provision was provided. The most impressive ecclesiastical site on the island is Howmore (Parker Pearson *et al*. 2004: 156), and the remains of a number of churches on that site certainly give a strong impression of an important late medieval religious centre. That importance may, however, stem from the time when it was linked with Iona and one suspects that this may post-date 1266.[17]

The only hint of a Norse ecclesiastical influence in South Uist is the dedication to St. Olaf at Kilauley (Cille Amhlaidh), in the north of the island.[18] All the other churches are dedicated to mainstream biblical figures, such as St Peter (Cille Pheadair), or early Celtic saints like the church dedicated to St Donnan (of Eigg) (Cille Donnain), which is another site that had some religious, and possibly secular, status (Parker Pearson 2012a).

The thirteenth century

Once the civil wars in Norway had ceased, there was a serious attempt to increase authority over the kings of Man, and a plundering raid in the west by Norwegian 'pirates' in 1209 compelled King Ragnvald and his son Godred to go to Norway to renew their oaths of allegiance and pay the overdue tribute (Anderson 1992 vol 2: 381; Crawford 2015: 233).

The growth of a strong Norwegian kingship under Hakon Hakonsson saw a repeat of the late eleventh-century situation: a king who was well-established at home wished to seek glory overseas and reassert authority in his colonial dominions, or 'skattlands' as they were called.[19] In Hakon's case, this was in direct response to the expanding power of the Scottish kings, who also desired to have the islands off the west coast of Scotland within their control, as a symbol of their imperial authority. The story is a complex one, concerning the relationship of the Norwegian king with the kings of Man and members of the Somerled dynasty in the Hebrides.

The way in which the different members of Somerled's family (the MacSorleys) responded to the difficult political situation in which they found themselves is rather remarkable; perhaps not surprisingly, they chose different paths, according to how they felt their own personal position might benefit. Members of the MacRuari sept of the family (who controlled the central portion and the southern group of the Outer Isles, including the Uists), Dugald and his son Erik remained steadfast in their allegiance to Norway (McDonald 1997: 119, 124). In 1258 Dugald led a 'great fleet' that plundered a merchant ship off Connemara and 'returned to his own country with joy and profit' as the Irish account records (McDonald 1997: 118). We might make the assumption that his men in the Uists would have benefited from such adventures.

Dugald played an active role in all the stirring events leading up to the arrival of the great Norwegian expeditionary fleet in the summer of 1263.When it sailed south from Skye and into the Sound of Mull, Dugald came to King Hakon 'in a light cutter' (probably a 'skuta' of *c*. 18 benches) and they sailed on together, the whole totalling 120 ships 'and most of them great' (Dasent 1894: 347–8). The outcome of the expedition was resolved in a skirmish at Largs, followed by the retreat of the Norwegian fleet north to Orkney. Hakon's death during the following winter spelled the end of Norwegian political hegemony in the Hebrides.

After 1266

The political negotiations which led to the Treaty of Perth were conducted in a statesmanlike spirit between the envoys of Hakon's peaceable successor, Magnus Hakonsson 'the Lawmender', and members of the Scottish government. The treaty itself was formulated as if the Western Isles were 'sold' to Scotland, with a clause that 100 marks a year were to be paid 'in perpetuity'. One of the conditions included was that supporters of King Hakon were not to be punished 'for the misdeeds or injuries or damage which they have committed hitherto', and they could choose to leave or to stay, and if they chose to leave 'they may do so, with their goods, lawfully, freely, and in full peace', that is, without any reprisals (Donaldson 1970: 35 includes a shortened translated version of the Treaty of Perth). Presumably these conditions would have been publicized in the islands, but we have little evidence of what the results of the political change were.

Integration of the west with the Scottish kingdom proceeded slowly (McDonald 1997: 131). It was not until 1293 that the extension of Scottish law and custom was firmly established with the creation of three new

Figure 25.2. A resident of Loch Aoineart, South Uist stands in the doorway of her turf-walled blackhouse, photographed by Werner Kissling in 1936; this style of wall construction is similar to that of the Norse-period houses at Cille Pheadair (courtesy of the School of Scottish Studies)

sheriffdoms, which were carved out of the former kingdom of the Isles. The northernmost was awarded to William earl of Ross and comprised the whole seaboard north of Ardnamurchan, along with all the Outer Hebrides and Skye.

This was about 50–100 years after the settlement sequence at Cille Pheadair had finished. Occupation continued at the nearby settlement of Bornais until abandonment in the fourteenth/early fifteenth century (Sharples 2005d: 195–7; 2009) when there was a shift from the machair to the neighbouring blackland (Parker Pearson *et al*. 2012; Sharples and Parker Pearson 1999). One is tempted to see this as a reflection of the big changes occurring *c*. 1300 as the Scottish influence came to bear on Hebridean island life and the Hebrideans' own life-style. Exactly what sort of economic effects this would have entailed is very difficult to know but changes in taxation and rental arrangements might have exacerbated deteriorating environmental conditions (Oram and Adderley 2010: 142–3; Parker Pearson *et al*. 2004a: 162).

The point is made by McDonald (1997: 133) that, as the Treaty of Perth had forbidden the forfeiture of any landholders in the west, therefore the Scottish king used Alexander of Argyll (son of Ewan of the elder line of MacSorleys) to be his main representative in the west and indeed to receive oaths of fealty from the landholders, and to then confirm them in their holdings. Can we assume from this that there was little disruption to the life of those who lived in the islands? Their immediate overlords – the three branches of the MacSorleys – remained in position, although being more closely tied into a feudal relationship with the representative of the king of Scotland, the kingdom to which they now belonged. But what happened to their followers and tenants?

In one particular way, the means by which the Norse settlers had maintained a wealthier lifestyle than might be expected from their situation on the outer coastal fringe – by participating in the expeditions of the kings or the earls (as discussed above) – might have continued. For McDonald explains how the descendants of Somerled were integrated into the Scottish kingdom by becoming leaders of a navy of 90 ships which was gathered to crush a rising in the Isle of Man in 1275. Thus the MacSorleys had become agents of the Scottish crown, and 'it would be difficult to find a better example of their integration into the mainstream of Scottish society' (1997: 135).

Alexander son of Ewan and Alan son of Ruari would certainly have provided some of these ships and the complement of fighting men from their territories. So the seamanship and fighting skills brought by the Norse to the Hebrides endured, foreshadowing the period when the Hebridean 'galloglasses' – 'mercenary troops of mixed Gaelic and Norse extraction from Argyll and the Western Isles' (McDonald 1997: 154–5) – played an important part in Scottish–Irish relations.

The very difficult cultural issues of language and ethnicity are deeply relevant to the situation in the Hebrides

in the thirteenth century. The hybridisation of the Norse and Gael was certainly a factor, although probably to a varying extent, throughout the island chain. McDonald's assessment of the situation sees that hybrid society 'already in existence or well on its way to formation' by the time of the Treaty of Perth (1997: 140). The examples of nomenclature in the Somerled dynasty exemplify this, both Norse and Gaelic names being given to his own offspring. But thereafter the Gaelic names predominate and, moreover, the Scottish royal name Alexander appears among the first-born sons in the middle of the thirteenth century. This perhaps tells us better than anything about the change in cultural priorities, and doubtless change in language went along with the change in nomenclature. It is, of course, very difficult for such a transition to be perceived in the archaeological record. What the archaeology does reveal is the survival of the Norse building tradition in the single-storey, linear island blackhouse (Figure 25.2), an architectural style that survived until the twentieth century (*e.g.* Branigan 2005).

25.2 The Norse-period farmstead at Cille Pheadair

M. Parker Pearson

By the time the inhabitants of Cille Pheadair built their first stone-walled farmhouse, constructed in *cal AD 1030–1095*, the Norse world and its influence stretched over 4,000 miles (*c.* 6,400km) from Vinland in America to Constantinople and the Black Sea. One of the great Viking trade routes – the 'sea road' between Norway, Iceland (both about 500 miles/800km away from South Uist) and the Northern Isles (Orkney 200 miles/320km and Shetland 300 miles/480km away) to the north and Dublin (almost 300 miles/480km away) and the Isle of Man to the south – passed its doorstep (Griffiths 2010).

The Norse kingdoms were also converting to Christianity. By 1031, Cnut was ruling over England, Denmark and Norway, and had received the submission of Scottish kings. When the Cille Pheadair farmstead was finally abandoned, about 150 years later, the world of the inhabitants of South Uist was very different. Links with Norway, some 500 miles/800km away, had weakened and, as Barbara Crawford has discussed above, the Uists were drawn into the Gaelic-speaking world of the Somerled dynasty. Within a few decades, the Norwegians' hold over Scotland would be fatally weakened by their defeat at the Battle of Largs in 1266. The Norman English kingdom was also providing an economic draw for Hebrideans to look southwards to the Irish Sea rather than to the North Atlantic.

The Norse-period farmstead at Cille Pheadair was probably one of three or more identified along this half-mile stretch of coast (Parker Pearson 2012c). The founders of the farmstead chose a level stretch of machair sand for their building. The ground had been disturbed by a single episode of ploughing at some earlier juncture. A hundred metres or so down the coast to the south, a woman had been buried in Pictish style 250–400 years earlier, although we may never know, because of the sea's advance, whether there was a Pictish-period settlement nearby.

The site chosen for the farmstead was not ideal. The settlement was positioned on a sand bar or peninsula, separated by a loch from the agricultural blackland to the east, and the moorland pastures beyond them. A thousand years before, this lagoon had been tidal, with a cockle strand exploited by the Iron Age inhabitants of the Kilpheder wheelhouse; by the time the farmstead was founded, it had become a freshwater loch, with the inlet from the sea cut off by sand accumulation just south of the Pictish tomb. Immediately south of the settlement there was a gap in the expanses of rock outcrops in the shallow water, which might have been modified to form a boat noust.

Initial construction

The precise sequence of initial construction is unclear. A sunken-floored, rectangular area was created within an enclosure of embanked sand, in the interior of which a large number of pits were dug in *cal AD 945–1020*. Probably before this, two north–south lines of holes, up to 8m long, were dug to hold small posts, possibly for a small timber building. The creation of the embanked enclosure destroyed all but the deepest parts of the postholes.

The sunken-floored enclosure was dug to contain a longhouse with stone-footed walls but, before that building was erected, a mass of pits – later than the two rows of postholes – was dug across the interior of the enclosed area (see Figure 3.8). Many of these pits were dug in such a way as to form a pair of parallel north–south rows, as if they too were postholes. Even if that was their builders' intention, the pits never held uprights and were rapidly back-filled with relatively clean sand, with low proportions of peat ash and charcoal, and modest quantities of broken artefacts and animal bones.

Two of the pits were filled in at the same time, given the presence of conjoining fragments of a pin in different pits, but not all were necessarily filled in a single event. Most contained the well-fragmented debris of daily life, with a surprising number of species represented among the small quantity of animal bones and a wide range of broken artefacts especially bone pins; only one pit contained a deposit that could be a foundation offering, in the form of a complete copper-alloy pin, a broken-up antler comb and a quantity of ironwork.

The first stone-walled longhouse

The size of the sandbank enclosure's sunken interior, at about 17m × 5m, was sufficient to contain a good-sized longhouse that could use the surrounding stone-revetted bank as the footings for its turf walls. So it is something of a surprise to find that the longhouse constructed within the enclosed area measured only 8.4m × 4m, leaving a presumably open area to its north within the enclosure's interior (see Figure 4.1). The various pits and other features in that northern half of the enclosure are probably slightly

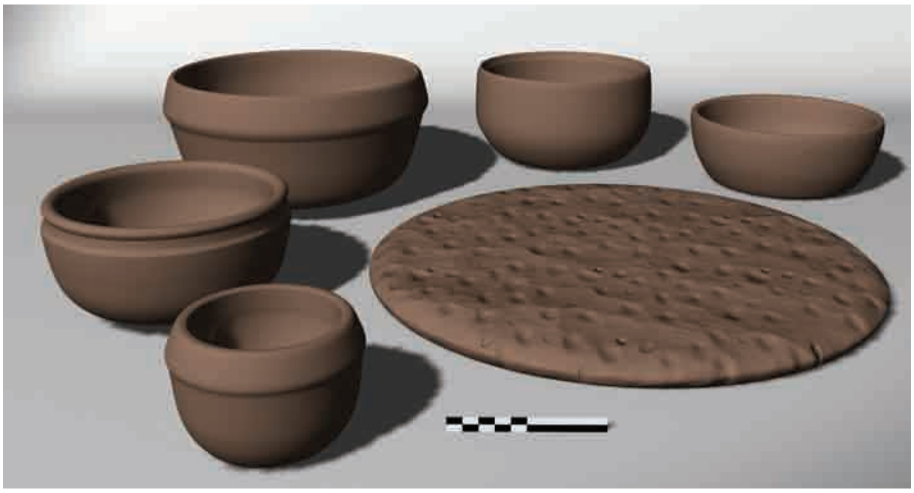

Figure 25.3. Reconstructed Norse-period ceramics from phase 2 at Cille Pheadair

Figure 25.4. A reconstruction of House 500's interior, viewed from the south end of the house

earlier than the first stone-walled longhouse. One contained a complete but broken comb, possibly a foundation offering. Other pits contained the remains of large pots that could have been used in feeding the workforce who helped in building the house, as well as the distinctive platter ware of the Norse period, used for baking on the fire (Figure 25.3).

The interior layout of this longhouse, with its rectangular plan, rounded inside corners, central long hearth, and single doorway towards the end of one long side, was to be repeated in successive builds at Cille Pheadair. The wall footings of stone were never more than five or six courses high, forming a base for the interior edge of a turf wall that can only have been about 1m wide.

As Niall Sharples has discussed for a slightly later house at Bornais (2005d: 183), the Cille Pheadair houses were probably 'rafter houses' (Ágústsson 1982) in which the roof was supported on timber posts at the corners and along the sides of the walls. A tie beam and rafters would then have been jointed into a wall plate running along the tops of the uprights. The interiors of some Norse houses might have been lined with timber (Figure 25.4), perhaps imported to relatively treeless islands such as the Northern and Western Isles (Batey 1995). The roof is likely to have been thatched in a manner similar to traditional practices in the region (Walker *et al*. 1996), with a layer of thin turves covered with straw thatch held in place by ropes weighted with stones (Figures 25.2).

The building technique of constructing a sunken-floored enclosure for the house to sit inside is not one associated with Norse-period architecture outside the Outer Hebrides

and appears to be a specifically local practice that drew on indigenous traditions of building that persisted for over 2,000 years from the Middle Bronze Age; the roundhouses of Cladh Hallan, just 5km away, were built in this fashion (Parker Pearson *et al.* 2004a; forthcoming.). In this way, the longhouse was hunkered down within free-draining machair sand, its low turf walls barely visible above the parapet of the enclosure bank, creating the visual effect of a thatched roof emerging from the sand. The house was thus well protected against strong winds, especially the prevailing westerlies and southwesterlies. Like the wheelhouses of an earlier age, the walls of the first two longhouses (phases 3 and 4) included blocks of gneiss obtained either from Iron Age buildings or from outcrops in the eastern hills. From phase 4 onwards, the longhouse's walls were constructed using water-worn gneiss boulders collected from the beach.

Whilst the Bornais houses were similarly dug into the machair sand (Sharples 2004; 2005d; 2012b; Parker Pearson *et al*. 2004a), there is no sign at that settlement that the upcast sand was used to form a stone-revetted embanked enclosure. It is possible, however, that the walls of the tenth-century longhouse on Drimore machair (MacLaren 1974) were set within such an enclosure; as Graham-Campbell and Batey have observed (1998: 175–7), the excavation plan of Drimore probably reveals a series of builds, starting with a Late Iron Age cellular building partially preserved at the building's west end. The first house at Drimore might well have been about 9m long, later enlarged to 11m, set within an embanked enclosure whose bank has survived along the northern edge. The bank on the southern edge might have been disturbed by two buildings sharing a party wall with the longhouse. The Drimore longhouse's curious, angled east end is difficult to explain, possibly resulting from yet more modification.

The inhabitants of the first longhouse at Cille Pheadair (House 700, constructed *cal AD 1030–1095*) dumped at least some of their rubbish outside the east-facing doorway in a series of middens that later grew into a single, sizeable mound into which later rebuilds of the farmhouse would be inserted in succeeding centuries. One of the many useful consequences of excavating Cille Pheadair at the same time as the Norse settlement at Bornais was that contrasts in deposits could be appreciated very clearly. The most interesting of these was the degree of colouration of the middens and other fills: the pale colours of light brown, cream and beige midden layers at Cille Pheadair contrasted strongly with the dark brown and reddened deposits at Bornais.

This difference in the composition of the midden deposits at the two settlements must relate to the quantities of peat ash and burnt materials being mixed with the white windblown sand. Bornais was larger and more populated, and has evidence for large hearths and fireplaces both inside and out; at Cille Pheadair, the only substantial hearths were those inside the longhouses. Even so, the striking difference between the midden layers at Cille Pheadair and those at Bornais could be explained further: possibly some of the peat ash at Cille Pheadair was taken out to the fields for manuring, but this is unlikely given the distribution of finds restricted to within the confines of the settlement itself. Intensive fieldwalking along this stretch of machair reveals that archaeological finds occur only in settlement mounds (Parker Pearson 2012c).

No ancillary buildings belonging to this initial longhouse phase were found during excavation. However, quantities of slag and hammerscale in the middens north of the doorway point to the existence of a smithing area or smithy somewhere nearby to the northeast. This was probably used for repairing and making items for farming and fishing rather than constituting industrial production separate to these subsistence activities. As at Bornais (Sharples 2005d: 180), no rotary querns or their fragments were recovered from Cille Pheadair, hinting at the probable presence of upland water mills (*cf* Batey 1993) beside streams in the higher ground to the east.

The middens and floor of this first longhouse at Cille Pheadair offer an interesting perspective on diet and lifestyle. One artefact, a Pictish bone pin, was centuries old when it was deposited – resonating with possibilities surrounding the integration of Norwegian and indigenous ancestries. The continued tradition of potting, albeit in styles radically different to those of the pre-Viking Late Iron Age (Parker Pearson 2012c), also points to survival of indigenous traditions within a predominantly Scandinavian culture.

The staple crop continued to be barley, with an increase in the quantity of oats being grown in comparison to Iron Age sites. Rye was introduced, as was flax, grown for its linseed oil and presumably for its fibres, given the presence in later phases of Cille Pheadair of whale bone tools for beating and scutching. Heckle teeth and, from earlier and later phases, spindle whorls and lucets indicate that the spinning of wool and thread-making were important; pin-beaters and a weaving batten reveal the types of loom used by the inhabitants.

Animal husbandry at Cille Pheadair was similar to that at the Norse settlement of Bornais (Mulville 2005; 2012), concentrating on sheep and cattle, with a few notable differences. At both Cille Pheadair and Bornais, cattle were slaughtered later in life than is seen at Iron Age sites. A focus on older cattle suggests herd conservation and an increase in herd size and may be related to working the land more intensively. There was a greater proportion of pigs at Cille Pheadair than at Bornais.

On all the Norse-period sites – Bornais, the Udal and Cille Pheadair – horses were present in greater numbers than seen at Iron Age sites. Butchery-marks suggest that horse was eaten at Cille Pheadair even though its eleventh/twelfth-century inhabitants wore bone crosses indicative of Christian beliefs; this was long after Pope Gregory III's edict in 732 prohibiting the eating of horseflesh.

Cille Pheadair produced huge quantities of fish bones, five times the number from Mounds 1 and 3 at Bornais (Ingrem 2005; 2012). Fish bones were found in every phase, and the species present are typical of the Norse

period in the North Atlantic. Whilst the mammalian assemblage of sheep, cattle, pigs and deer, along with dogs, cats and horses, shows little change from Late Iron Age assemblages, the increase in fish remains is evidence for both economic and cultural change with the arrival of Scandinavians (Barrett 2003; 2004). Clare Ingrem has shown that the Cille Pheadair assemblage derives from offshore fishing, principally for cod, pollack and herring.

Life within the longhouse centred on the hearth. At its northern end, material incorporated into the soft peaty sand matrix of the floor indicates that key tasks took place here. Cooking activities (indicated by small fragments of broken pots) were performed in the northeast whilst other tasks involving potting, carcass dismemberment and bone breakage were carried out in the west and northwest. The northern end of the house generally was strewn with broken artefacts, indicative of crafts and activities carried out at this end of the house. Box beds probably lined the west and east walls although there was no evidence of their positions (as was seen in the next phase). Small objects ended up in these peripheral locations, presumably lost in the gaps and crevices between beds and furniture. Similarly, a few fragments of faeces against the walls and skeletons of small mammals reveal the presence of a cat and its prey.

Otherwise the house was kept clean, swept out regularly, with some of the sweepings ending up around the doorway. It may well be that the broom was a Norse-period introduction to Hebridean domestic life: evidence from Iron Age roundhouse floors in South Uist suggests that refuse was cleared from floors rather than swept, whereas the Norse-period floors at Cille Pheadair reveal a characteristic sweeping pattern *vis-a-vis* the doorway.

Unlike Norse longhouses further north, such as at Sandwick on Unst in Shetland (Bigelow 1985), the Cille Pheadair longhouse had no internal byre for over-wintering cattle or other domesticates. We cannot be sure whether there was an external byre beyond the excavated area but the lack of such structures in pre-Norse settlements in Uist would suggest that there was not only no need for them but also no indigenous tradition for keeping stock indoors over the winter. Furthermore, it should be noted that Branigan argues convincingly that Hebridean blackhouses of the medieval and historical periods did not accommodate cattle inside the house (Branigan 2005: 21).

The inhabitants of House 700 were successful enough, either through trade or warfare, to amass – and to lose – a small amount of treasure: a quartered silver coin and an ornamented gold strip. The presence of small weights at Cille Pheadair (earlier in phase 2, and later in phase 5) suggests that at times the farmstead's inhabitants were involved in the buying and selling of precious metals and perhaps other small, high-value commodities. The Hebrides were well supplied with treasure in the tenth and eleventh centuries, with substantial silver hoards from Skye, Lewis and North Uist (Graham-Campbell 1995; Graham-Campbell and Batey 1998: 229; see Crawford above, 'The tenth century').

A find of five Late Viking gold finger-rings from the Hebrides, probably from the island of Oronsay in North Uist, is one of only two from Scandinavian Scotland (Graham-Campbell and Batey 1998: 236). Curiously, the settlement at Bornais produced many more artefacts of copper alloy than were found at Cille Pheadair, but little in the way of silver or gold ornaments. It would seem that the first residents of Cille Pheadair were wealthy and well-travelled even though their farm was isolated and not particularly large as an agricultural complex.

When the house was abandoned, little was left behind other than broken pots and other broken artefacts. This makes the presence of a few complete objects very striking. A bone pin and a comb were left on the floor at the northern end of the hearth, where cooking and other tasks had been performed (Figure 25.5). Perhaps these were deliberately placed here as closing deposits. They might even have had a funerary significance, marking the death of the woman of the house (or, perhaps, the man and woman of the house). The modelled radiocarbon dates suggest that the first longhouse might have been lived in for only a few decades, within the second half of the eleventh century, so there is a possibility that its use coincided with an adult lifespan and that its abandonment was occasioned by a death rather than by any need for renovation and rebuilding.

The second stone-walled longhouse

At the end of the eleventh century, a new longhouse (House 500, constructed *cal AD 1060–1110*) was built on the exact same spot, retaining part of the east wall and doorway of the previous house but otherwise enlarging the entire building (see Figure 6.1). Not only was the interior larger but a square room was added to the northern end of the house, accessed through a short passage and providing a small storage area furthest from the door. The entrance area was also elaborated, with the entrance passage lengthened and splayed outwards to create a small yard-like space whose stone walls held back the growing middens on both sides. The floor area of the new house was 75% bigger than that of the previous house. The construction sequence of House 500 is shown in Figures 25.6–25.9.

This practice of keeping part of the old building's walling within the new was also a feature of South Uist's ancient past, going back to the Middle Bronze Age, and indicating a degree of indigenous know-how in what was otherwise an alien architectural form deriving from Scandinavia. This tradition of rebuilding with just part of the old build being retained continued to the end of the Cille Pheadair sequence. It demonstrates a regional style of rebuilding which is distinct from that of the Northern Isles and northern Scotland, where new longhouses were often built onto the ends of earlier longhouses in a linear fashion, rather than on top of them (Batey 1987: 89).

This second longhouse was a relatively grand structure, built in the same fashion as the previous one with 1m-thick turf walls resting on a low drystone wall, and it can be compared with a probably eleventh-century building partially

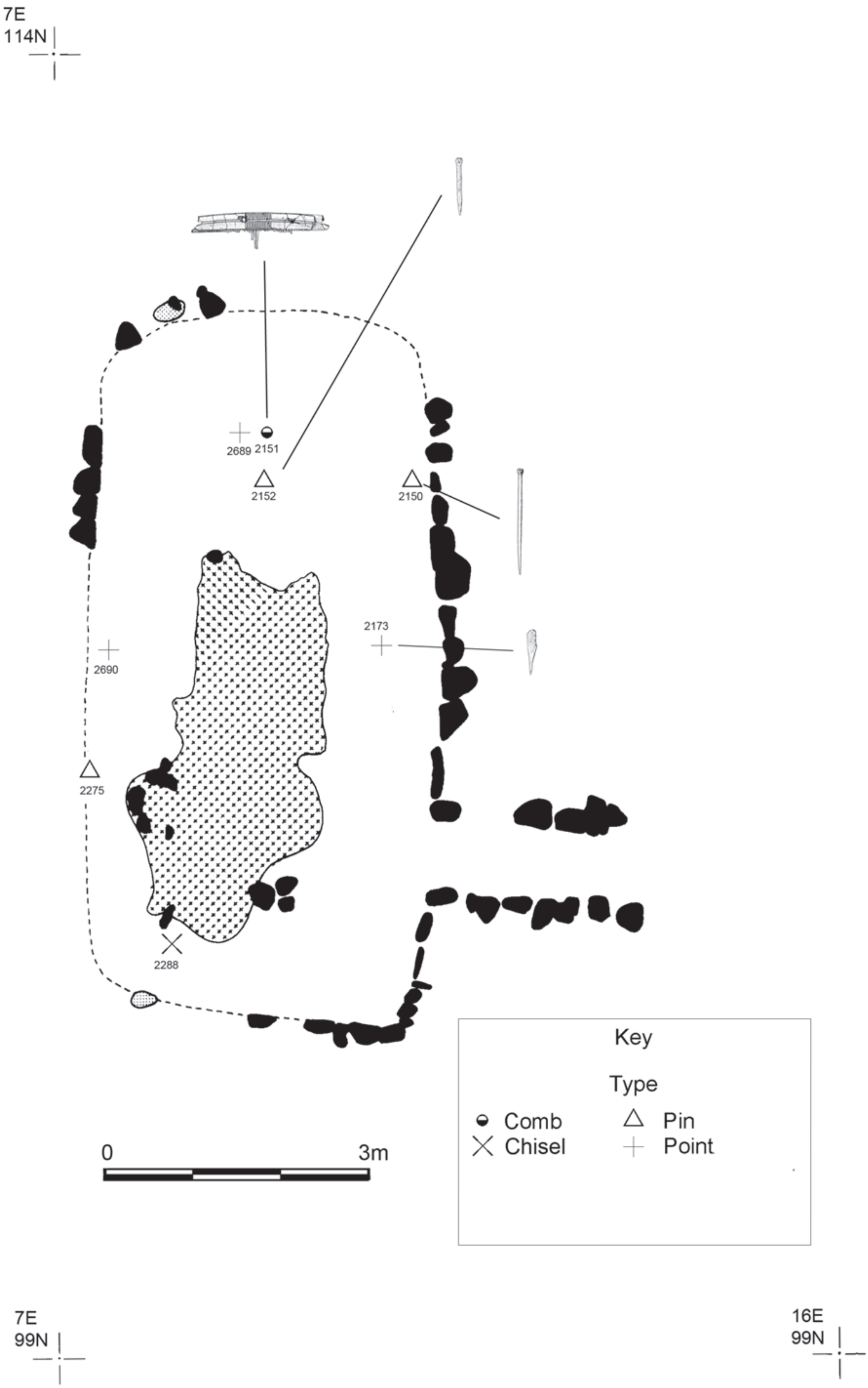

Figure 25.5. Distribution of selected artefacts on the floor of House 700 in phase 3

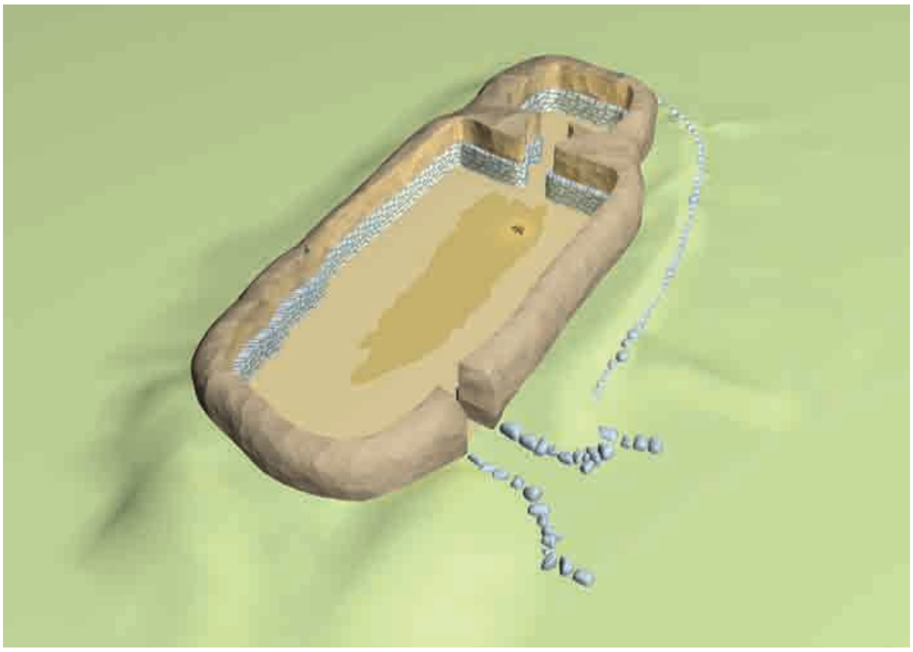

Figure 25.6. A reconstruction of House 500, showing the walls and the long central hearth

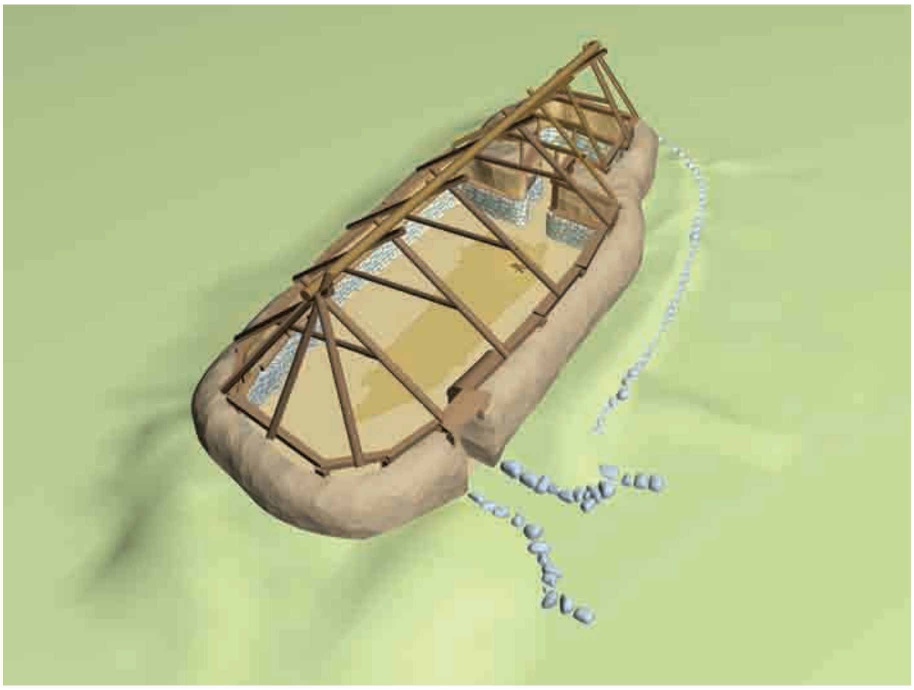

Figure 25.7. A reconstruction of House 500, showing the roof supports

excavated at Bornais Mound 1 (Sharples 2012b) and a thirteenth-century longhouse excavated by Iain Crawford at the Udal in North Uist (Crawford 1974: fig. 3; Selkirk 1996; Sharples 2005d: 181), both within likely centres of power in this period. Although part of House 500's northwest wall had been washed away before excavation, the surviving structure demonstrated that this was the largest in Cille Pheadair's sequence of five longhouses.

Construction involved the deposition of a layer of sand on which the peaty sand floor developed. Likely foundation deposits in the walls and construction fills include combs, bone points, bone pins, a bone needle, an iron knife, a broken hone and a smashed pot. The floor's contours were well preserved, enabling the outlines of sleeping areas and long-vanished wooden furniture to be identified along the west and east walls. One of these was a rectangular feature positioned just inside the door, presumably a large box or chest so heavy that, when this side of the house had its floor re-laid, the object was not moved and its outline was preserved by the edges of the new floor surface.

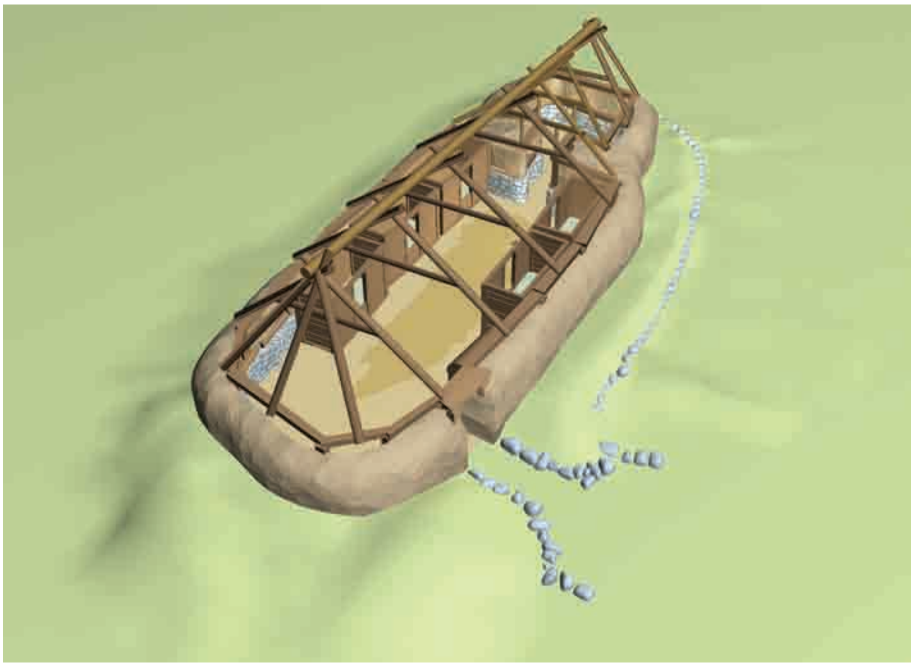

Figure 25.8. A reconstruction of House 500, showing the roof supports and box beds

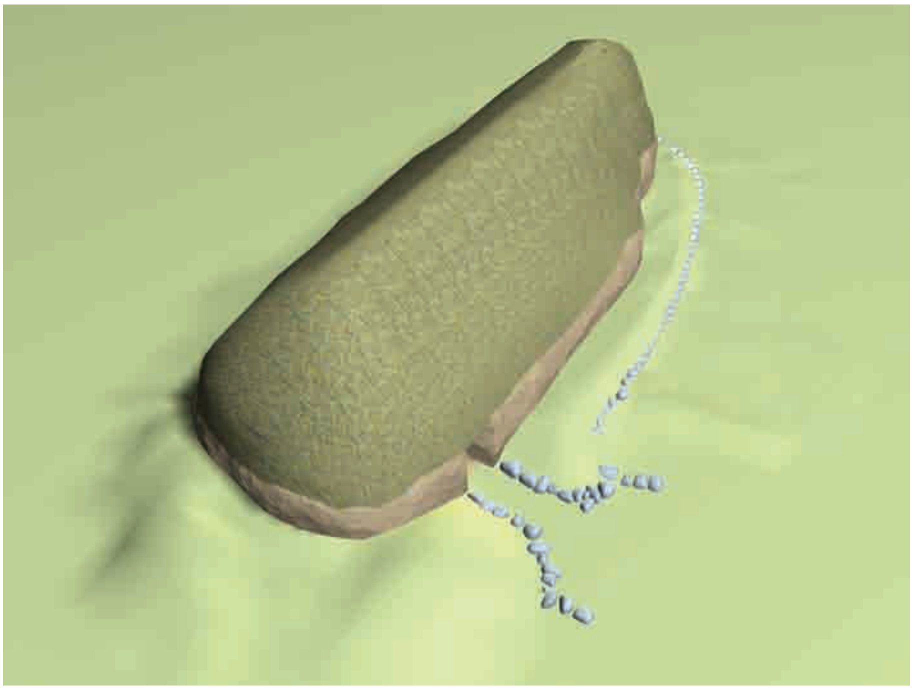

Figure 25.9. A reconstruction of House 500, with the roof in place

Activities around the long hearth were similar to those in the previous house. If it is not too simplistic to assume that the male and female couple at the head of the household sat at the northern end, then their dependants – children and possibly slaves – would have been ranged along the east and west sides of the hearth, sitting either on the floor or slightly further back on the edges of the box beds. The cooking was carried out in the northeast, with cooking pot sherds and pieces of slate, presumably used as lids and pot-stands, littering the northeast corner. In contrast, sherds of platter ware used for baking were concentrated slightly west of the cooking-pot sherds, indicating that different parts of the fire were used for boiling and baking. Tools and residues connected with fire-lighting, knife-sharpening, bone-breaking and perhaps craft work were concentrated northwest of the hearth, presumably where the man of the house sat on his wife's right. One of the unexpected curiosities of the house floor was the distribution of hundreds of small black, white and grey pebbles, suggesting that these had

Figure 25.10. Locations in Britain and Ireland with links to Cille Pheadair or mentioned in the text

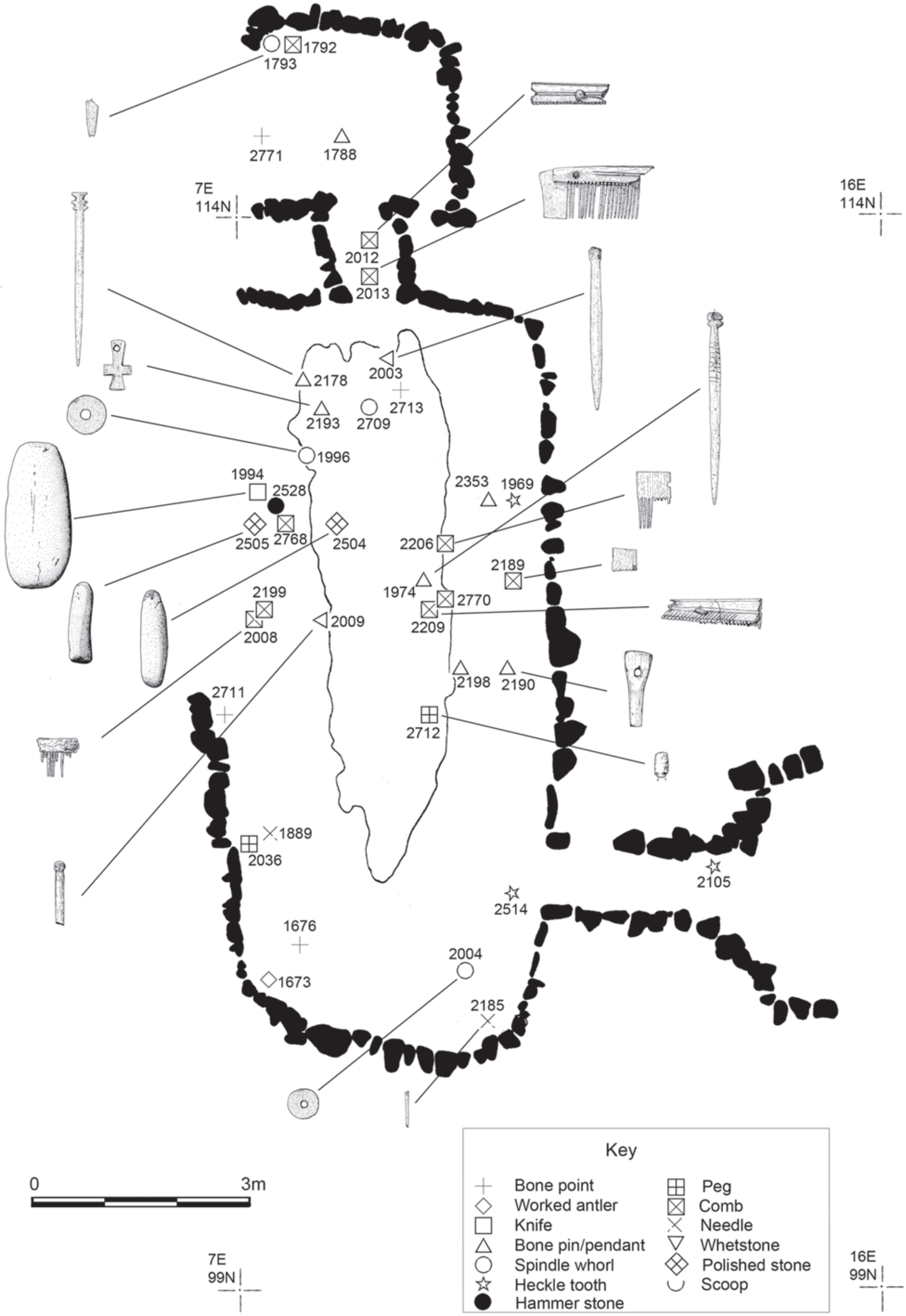

Figure 25.11. Distribution of selected artefacts on the floor of House 500 in phase 4

been used for interior decorating, arranged in coloured strips across the floor.

The north room (the small square structure added to the northern end of the house) was not used as a bedroom or withdrawing space, as might be thought given its protected location; the north room did have a small, ephemeral hearth, but was primarily used simply as a store. Potting clay was found here as well as in the southern end of the long room, but otherwise this back room appears to have been used for the storage of dried seaweed and perhaps other fuel for the fire such as small pieces of driftwood; the fire's main fuel, peat, would presumably have been stacked somewhere outside the entrance to the house.

Materials from the house floors and midden demonstrate much about life beyond the house at this time. The ship nails or clench nails derive from relatively small boats, 6m–14m long, which would have been used primarily for fishing and trading and were smaller than warships.

The early twelfth-century Minety-ware tripod pitcher (or pitchers), of which the pieces were found mainly on the floors of this longhouse and the north room, might well have been brought all the way from the port of Bristol (just over 500 miles/800km from South Uist and about 30 miles/48km west of the Minety kilns in north Wiltshire) by one of the household during a voyage along the length of the Irish Sea (Figure 25.10). Exchange relations between Uist and southwest England could have been established by the early eleventh century, on the basis of the imported pot from Bornais (Sharples 2004: 265, 269, fig. 6.4). The first documentary evidence for contact between western Scotland and Bristol, however, is not until 1275 when the Scottish king petitioned the English king to release some of Alexander of Argyll's men who had been held in Bristol, together with their vessel and goods, on suspicion of piracy (McDonald 1997: 129, 153–4).

At the end of House 500's use, the same closing offering of a comb and pin, as seen in the previous house, were left at the northern end of the hearth and a bone cross was placed in the extinguished ashes of the fireplace (Figure 25.11). Owl pellets littered the floor, indicating that the house was abandoned and the roof in disrepair.

Barbara Crawford (see 'The eleventh century', above) has alluded to the attack on the Uists by the Norwegian King Magnus 'Barelegs' in 1098 as possibly the cause of this abandonment; although the farm seems not to have been sacked or burned, its inhabitants might have met untimely deaths or been removed from the land. There is also a reference in the *Annals of Ulster* for 1098 to the killing of the crews of three 40-man warships from the Hebrides (Swift 2004: 189).

Modification of the longhouse

Around *cal AD 1070–1125*, the house was modified by the construction of an L-shaped wall across the northern part of the long room (phase 5): this halved the floor space, repositioned the doorway at the northern end of the east wall, and turned the north room into a stand-alone outhouse (see Figure 7.1). This pairing of a major building with an outhouse is a common feature of Late Norse settlements in the Northern Isles as well as the west of Scotland and is known at key sites such as the Brough of Birsay (Graham-Campbell and Batey 1998: 190). Except for a period in the twelfth century when the settlement site at Cille Pheadair was used only for insubstantial farm buildings (the 'sheds'), this pattern of a longhouse associated with a freestanding outhouse continued until shortly before final abandonment of the site in the late twelfth/early thirteenth century.

The modified house was then inhabited by people living around a central long hearth. Disturbance by later activity removed most of the floor associated with this phase of occupation but the hearth and its immediate surrounds survived. It was not possible to identify the spatial patterning relating to individuals sitting around the fire, as could be done for previous phases, but fire-lighting flints were concentrated northwest of the hearth and platter ware sherds to the southeast. The outhouse produced little evidence for use but might have continued to function as a store. The only other structure of phase 5 was a stack-base for a hayrick.

Large quantities of rubbish appear in the final midden layers of this phase, and in the abandonment deposits. The faunal remains from phase 5 show an increase in the consumption of cattle and red deer, as opposed to the previous importance of sheep. Among the items discarded in the middens and abandonment layers were a silver finger-ring, a bone pin decorated with a Ringerike-style motif, and a Baltic-derived spherical weight. This is one of only two in this style from Scotland, the other being from Orkney; a lead billet, probably used as a weight because of its closeness to the Viking unit of one *ore*, was found in a phase 2 sandbank deposit.

The sheds

After the phase 5 house was abandoned, two small structures were built on the ruins of the house around *cal AD 1100–1155.* Despite the presence of wood charcoal, no hearths were discovered in these conjoining turf-walled sheds and it seems likely that the modest assemblage of ceramics and animal bones derives from the inhabitants of a nearby but unlocated farmstead bringing cooked food from elsewhere to this agricultural out-station. The pottery vessels included large fragments of platter that were secreted into a small niche within the wall of one of the sheds. Some of the artefactual and environmental material may also be residual, from disturbance of the phase 5 house's abandonment layers. A worn silver penny of Cnut from Shed 406's base layer could have been a century old when it was deposited.

The east–west longhouse

In *cal AD 1105–1160,* a new start was made and the site was re-occupied with the construction of a new longhouse (House 312), an outhouse to its south and the base for a

hayrick to the north (see Figure 9.1). The architectural arrangements of the previous inhabitants were ignored, with the new longhouse being aligned east–west. In constructing the sunken floor of House 312, its builders made no attempt to respect the remains of the two sheds, instead destroying their south walls and much of the eastern shed (Shed 400). Instead, a small part of the south wall of House 312, towards its west end, was keyed into surviving masonry from the south end wall of House 500, re-establishing a symbolic and physical connection with the previous dwelling. It can be noted that the two sheds were built without any such referencing of the abandoned longhouse that they replaced.

The reason for this change in house alignment from north–south to east–west at Cille Pheadair is not known. A similar change, but from east–west to north–south, occurred at Bornais Mound 2 with the construction of House 3, probably in the thirteenth century (Sharples 2004; forthcoming). Given the contrasting orientations of north–south Houses 700 and 500 at Cille Pheadair and contemporary east–west Houses 1 and 2 on Bornais Mound 2 just five miles away (*ibid.)*, climatic conditions are patently not a sufficient explanation for house orientation. Since the doorway orientation and house axis are *not* the same in all houses of the same period (all of which would have experienced the same wind directions), it is more likely that the reasons why Norse longhouses were mostly orientated broadly north–south or east–west lay in choices dictated by cultural understandings of cosmology and religion.

There is no clear answer to this question of house orientation in the Norse period though Dennis Doxtater's research into post-Reformation Norwegian dwellings may point the way (1990). He suggests that the four cardinal directions were important cosmological reference points in Norse society and religion. North was the direction of the spirits (the gods and ancestors) and south the domain of the living and the mortal. The east–west axis represented both the gender difference (male in the west, female in the east) and the life passage (birth in the east, death in the west). He noted that post-medieval farmhouses (*stue* or *salr*) in Norway were aligned east–west whereas the *hov* (a loft or meeting house) was aligned north–south. Unfortunately this model fails to explain the Norse-period evidence. House 2 at Bornais has good evidence for being a building in which people could gather, along its hearth (Sharples 2004: 258–9), but it is aligned east–west. Similarly the fact that Scottish Norse-period farmhouses may be aligned east–west or north–south fails to fit the theory.

It is possible that seating arrangements in Cille Pheadair's north–south House 500 do bear out an aspect of this cosmological scheme in terms of the gendering of the east–west axis, with the likely seat for the man in the west and the woman in the east at the northern end of the hearth, given the different distributions of materials related to cooking and to craftwork. In such a setting, it is possible that seniority was organized along the length of the hearth, with the most junior nearest the door towards the house's southern end.

Just why the switch in orientation was made, as seen in the contrasting alignments of House 500 and House 312, for example, is difficult to explain. Did this change in orientation relate to the social status of the new house's occupants? Or to the material and ritual circumstances of founding a new house? Or was it merely architectural convenience, in which only two alignments – north–south and east–west – were acceptable but either could be implemented on a whim?

The outhouse in this period (phase 7) was partially attached to the longhouse (House 312), with its northern wall being a 1m-wide party-wall of turf shared with the south wall of the longhouse. Entry to the outhouse from the main house was not, however, exactly convenient. One had to pass northwards through the longhouse doorway (towards the east end of its northern wall) and then turn right in a clockwise direction around the gable end of the longhouse before heading west towards the outhouse door. This small building was probably used as a store, perhaps for nets and other fishing tackle, though it had a small central hearth on which lay a near-complete ceramic platter. Only peat had been burnt on this fire, in contrast to the long hearth within the dwelling which contained charcoal from driftwood and other wood types as well as peat.

Spatial organization of activities within the longhouse was similar to that in Houses 700 and 500, except that everything was re-oriented by 90°. The cooking and potting area was at the west end of the long hearth, while craft activities were carried out on its right-hand side in the southwest corner of the longhouse. Numerous small artefacts littered the floor and the hearth (Figure 25.12). One of these, a bone cross pendant, was possibly a closing offering; a likely foundation offering of an iron arrowhead was found in House 312's wall construction trench.

A human coprolite was found on the floor against the south wall opposite the entrance; presumably the house remained roofed for a short period after its residents had died or moved out. The roof then either was dismantled or collapsed so that the interior of the house filled evenly with a deep layer of windblown sand. In contrast, the outhouse remained standing and apparently continued in use.

The final longhouse

The final longhouse at Cille Pheadair (House 007; phase 8) was built in *cal AD 1140–1205*, across the sand-filled east end of House 312, reverting to the north–south orientation of previous longhouses on the site. Part of its long east wall was keyed into the east gable wall of House 312 (see Figure 10.1). It was a modest building, smaller than House 700, House 312 and the modified House 500 Stage II. The original wall thickness (1.2m) of House 007 can be gauged reasonably accurately because two lengths of eavesdrip gully were dug around its outside. Just why these were necessary on this free-draining sand is uncertain; however, the gully was not dug along the house's west side across the well-drained windblown sand infilling House 312, so providing drainage through

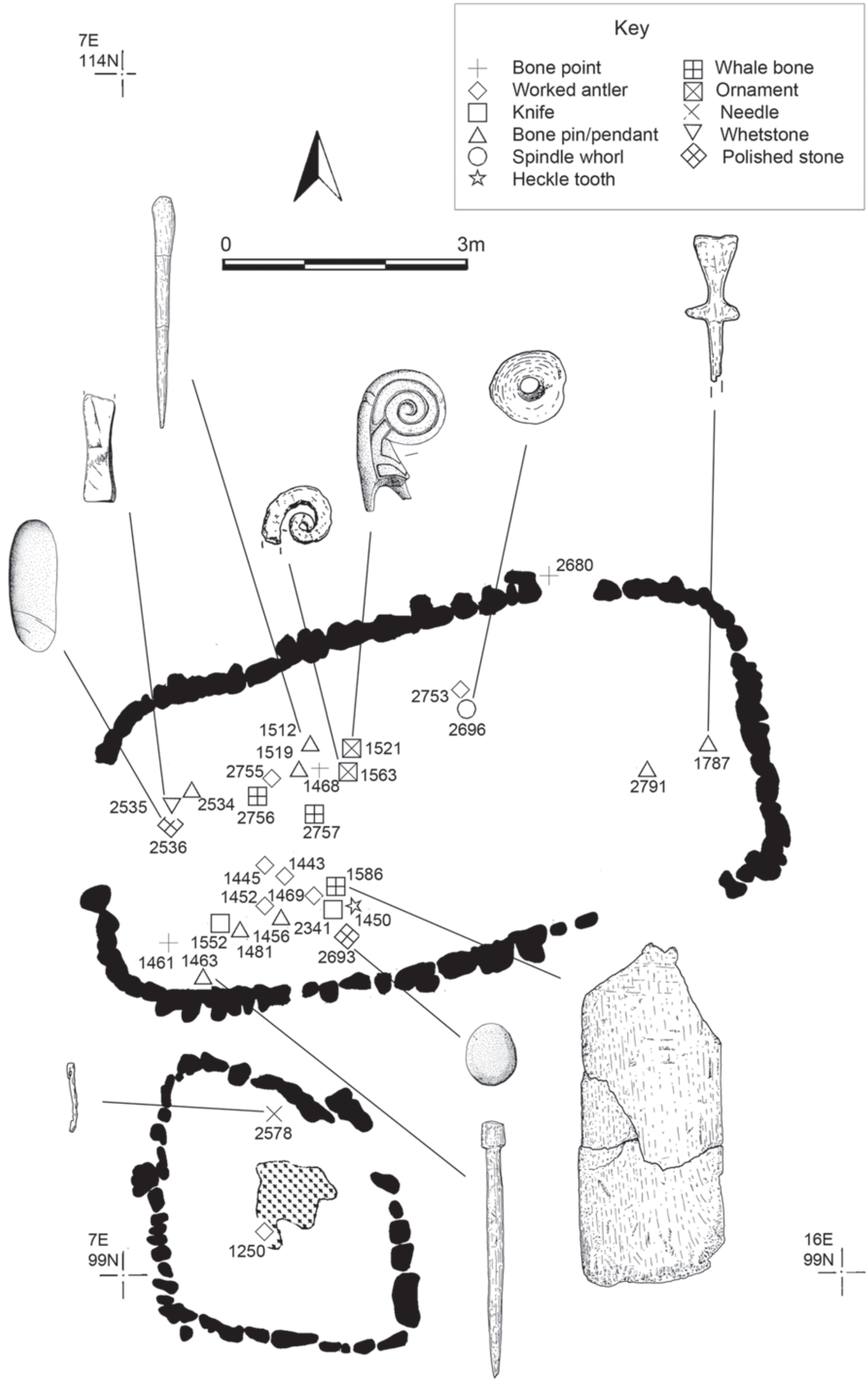

Figure 25.12. Distribution of selected artefacts on the floor of House 312 in phase 7

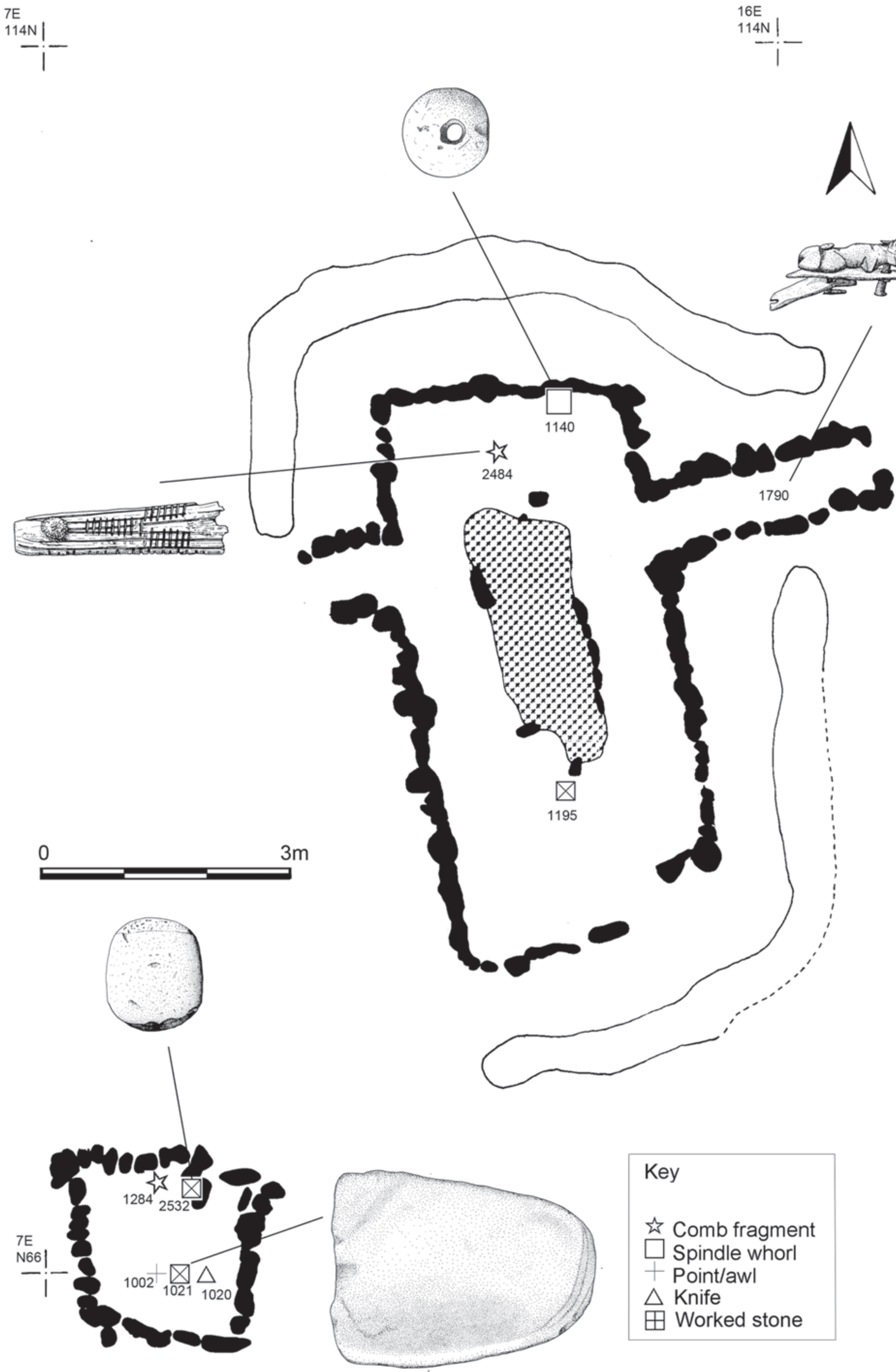

Figure 25.13. Distribution of selected artefacts on the floor of House 007 in phase 8

the adjacent and less porous midden layers might well have been the reason.

The plan of House 007 departed from the style of previous houses at Cille Pheadair. It had two doorways, placed opposite each other near its northern end. In addition, its corners were less rounded than in previous houses, and the gable end walls had slightly angled walls which broke the symmetry of the longhouse plan. This latter aspect has to have been deliberate because the south wall deviated from the line of the underlying wall of the previous house, House 312. This asymmetry is also found in the plan of the outhouse, both in the previous phase and for its later use associated with House 007. The angled ends of House 007 are reminiscent of the Viking Age Drimore longhouse but this is probably fortuitous since two centuries separate the use of these two dwellings.

The east doorway led to the outside along a 3m passageway, cutting through earlier midden deposits to provide access to the wider world. The west doorway led to a small pathway running southwards to the north door of the remodelled outhouse. Opposed doorways in the long sidewalls are unusual in Scottish Norse architecture, normally being found only in Shetland at sites such as Jarlshof (Hamilton 1956) and Sandwick (Bigelow 1985); they are classically features associated with house plans from pre-Viking Scandinavia. In the Isle of Man in Norse-period houses, such as Cronk ny Merriu, opposing doorways are found in the short, gable-end walls (Colleen Batey pers. comm.).

For some reason, perhaps because of the draught created by opposed doorways on the axis of the prevailing westerlies, the east doorway was blocked up. A well-worn route led out of the west doorway to the outhouse rather than eastwards off the settlement mound.

House 007's interior failed to produce the level of detail about the use of space recovered in earlier houses on the site because its floors had been so well swept (Figure 25.13). It was also damaged by later activity, during the final phase of occupation of the site. Few finds or smaller residues accumulated on the floor; its peaty sand surface was almost entirely worn away. However, it was still possible to identify the cooking area at the southern end of the long hearth, furthest from the doors. The inhabitants' use of space was similar to that in previous houses except that the orientation was now at 180° to that seen in Houses 700 and 500. The presence of a large comb fragment placed axially beyond the north end of the hearth in House 007 recalls the positioning of what were evidently closing deposits of combs and pins in previous Houses 700 and 500. In the immediately preceding longhouse (House 312), a bone cross pendant occupied this position at the end of the hearth, and no combs at all were found on that house's floor. So the comb fragment in House 007 is possibly a closing deposit harking back to an earlier tradition.

Amongst the artefacts, platter ware remained common, forming over 40% of all the pottery associated with House 007 and its outhouse. No middens associated with this farmhouse were located during the excavation; presumably they were located further east, outside the excavation area. We therefore have only a restricted view of the waste generated from consumption inside the house. A copper-alloy mount with a cast lion or feline is not of Norse or insular origin and might have come from the Carolingian empire or further south. This stands out in an assemblage that is generally local in its manufacture.

House 007, built in *cal AD 1140–1205*, may date to the period around 1170 which Iain Crawford (1988) identifies as the termination of the Late Norse phase at the Udal, with the end of turf-walled buildings and the disappearance of platter ware, followed by wholesale clearance and redevelopment. In Crawford's view, this was the result of a takeover by Gaelic lords – the sons of Somerled – expanding their power northwards; Somerled had taken some of the Hebrides from the King of Man after 1156 (see Crawford above, 'The twelfth century').

It is possible that this change in political power coincided with the end of longhouse-occupation at Cille Pheadair. The sequence of houses at Bornais, however, continued longer, until the fourteenth or even early fifteenth century (Sharples 2005d; 2012b; forthcoming), despite this fundamental change. House 007 was abandoned before *cal AD 1160–1245*, although the roof probably remained in place. Its interior was divided into two bothy-like shacks, small and rectangular in plan, one within each end of the house. On their small hearths the new 'residents' cannibalized the interior fittings and timber architecture of the house's interior, burning a wide variety of tree species in their fires.

Among the small items retrieved from this final phase of activity are a bone bead, a metal bead and a cut halfpenny of the reign of King John, dating to c. 1206. Platter ware was not much used in the ruins, falling to just 16% of the phase's assemblage, although it continued at Bornais until the fourteenth century (Lane 2005: 194). A sherd from the final infilling of windblown sand and fallen stonework has an out-turned rim characteristic of post-Norse medieval pottery of the thirteenth–fifteenth centuries (Parker Pearson 2012c). Just where contemporary settlement in the Cille Pheadair area was now located is not known; by analogy with the shift of settlement at Bornais (Parker Pearson *et al*. 2012; Sharples 2005d: 195–7), it might have moved to the blackland east of the freshwater loch.

Cille Pheadair in context

Reviewing the sequence at Cille Pheadair, there are certain aspects of identity and of incorporation of its people into the wider Atlantic world that are revealed by examination of the settlement's architecture and portable material culture. For example, all of the antler combs are single-sided composite forms; there are no double-sided or double-edged pieces. This is unusual given the popularity of double-sided combs in Scandinavia, the Northern Isles and Ireland (Dunlevy 1988). On South Uist itself, there are examples of double-sided combs from Bornais, just 5 miles/8.1km away (Sharples and Parker Pearson 1999), as well as the Udal (Selkirk 1996).

As Clarke and Heald have demonstrated (2002), combs could symbolize regional identity in Late Norse Scotland, even if the combs were imported from Scandinavia. Adoption of such styles was probably not merely a matter of commercial availability and geographical proximity but also of consumer choice. Personal items such as combs would have expressed commonalities shared with others in the Norse world. Only one of the double-sided combs from Bornais is a fish-tail comb, a style otherwise known exclusively in Scotland from the Northern Isles and Freswick.

Perhaps the more eclectic range of comb styles at Bornais and the Udal indicates the range of the political and social influence of these major settlements, connected to people from many parts of the Norse world. In contrast, Cille Pheadair may well be more typical of the average Hebridean Norse-period farm.

The geographical origins of trade goods at Cille Pheadair do, however, reveal the existence of certain economic and social ties through the Norse period. From phase 1 to phase 5, reindeer-antler combs, hones from Norway and soapstone/steatite artefacts (probably from Shetland – 300 miles/*c*. 380km away – although Norway cannot be ruled out) demonstrate links between Cille Pheadair and the Norse homelands. From phase 5 onwards (from *cal AD 1070–1125*), there are almost no artefacts present that would have been traded from the north. Instead, the Minety-type pot, the coins dating to the reigns of Cnut (minted in York) and of John (minted in Norwich), and the many pins and other small artefacts with parallels among Irish examples point to trading connections southwards across the Irish Sea (see Figure 25.10).

It is difficult to gain much of an idea of the ancestral and cultural links of the Norse settlers in Uist in the absence of skeletal remains permitting ancient DNA analysis, although research on modern DNA shows a distinct sharing of genes by Hebrideans and Norwegians today (Helgason *et al*. 2001; Sykes 2006: 250–1). The accounts of the sagas, for what they are worth, provide more detail of Hebrideans' connections with Iceland rather than Norway; many of the founders of Icelandic families arrived there via the Hebrides. Despite the presence of Scandinavian combs, Norwegian hones and (possibly) Norwegian soapstone at Cille Pheadair, its inhabitants lived in a world with ancestral and kinship links that might have extended towards Iceland (500 miles/800km) and Ireland (140 miles/225km) more than to Norway (500 miles/800km) and the Northern Isles of Scotland (200–300 miles/320–480km).

Cille Pheadair's changing economic links mirror the political changes of the twelfth century that first saw political power shift from Norway to the kingdom of Man and then the rise of Somerled. Events further south also changed the wider political and economic landscape; William of Normandy's conquest of England in 1066, hard on the heels of Harold's defeat of Tostig and Harald Harðraða, King of Norway, at Stamford Bridge, ultimately led to England's economic incorporation into European networks to its south and east.

By 1158, Somerled's defeat of Man had given him control of all the Hebridean islands. Although Godred recovered much of this territory on Somerled's death (Duncan and Brown 1957: 196–7; Sellar 2000), Somerled's son Reginald might well have maintained control over the Uists (McDonald 1997: 70), and the Outer Hebrides became part of the territory of Somerled's descendants (see Crawford above, 'The twelfth century') Thus Uist's inclusion within political realms of ever-decreasing size might also have had an economic effect in reducing the quantities of long-distance imports coming into the Western Isles, as represented by their declining numbers in depositional contexts from the later phases at Cille Pheadair.

Architecture and the use of domestic space

The architecture of Cille Pheadair is distinctly Norse, taking the form of the hall-house found throughout the Viking world. The long hearth, with beds either side of it, at the heart of the household is also a feature of this Norse heritage. The pairing of dwelling and outhouse can also be found across Norse Scotland and beyond. Yet the buildings also exhibit a distinctly Hebridean identity within the Norse world. As noted above, the tradition of pottery use (but not the ceramic styles) shows continuity with pre-Viking life in the Hebrides, and the incorporation of walling from an earlier build is also a pre-Viking tradition in the Uists. This has led to some debate about the nature of the Viking arrival and whether it involved genocide and enslavement (Crawford 1974; 1981) as opposed to assimilation and integration (Sharples and Parker Pearson 1999; Barrett 2003; 2004).

There is no way of knowing just how violent and bloody was the Viking ascendancy in the Uists, but the evidence for continuation of themes of indigenous life suggests that Norse hegemony was less all-encompassing than in, for example, the Northern Isles. Norse became the dominant, if not sole language, giving us today most of South Uist's township names (which paradoxically have now been Gaelicized in their written form by official policy, thereby camouflaging their true Norse ancestry), but other forms of non-verbal communication and identity survived the Viking colonisation.

The Late Norse houses of Uist have certain features that make them distinct from the Viking architecture of the Northern Isles (Batey 1987: 293–8; Graham-Campbell and Batey 1998: 155–205), Greenland (Skaaning Høegsberg 2009), Iceland (Milek 2006; Lucas 2009), the Faroes (Stumann Hansen 2003), and Ireland (Wallace 1992; Lynn 1994).

The custom of building on the ruins of the previous house, thereby incorporating an element of the old in the new, has been noted above; it is possible that this pre-Viking tradition continued across the transition at Drimore, where the longhouse's west end may derive from an earlier build (MacLaren 1974: fig. 1, pl. 1; Graham-Campbell and Batey 1998: 175–7), and at the Udal, where the east end wall of a Norse longhouse of level X is on the same line as the wall of a Pictish cellular house of level XI (Crawford 1974: fig.

3). Similarly, the north wall of the level X house is on the same line as the south wall of the level IX house dating to 1200–1250; of course, only full publication of the Udal excavations will reveal whether these are valid observations.

The sizes of the Late Norse hall-houses in Uist are, on average, smaller than those in Norway, Iceland, Greenland, the Northern Isles and northern Scotland. Viking houses in west Norway are normally 12m–15m in length, with a few up to 20m (Løken 1999). In Orkney, many of the houses at the Brough of Birsay and other Norse settlements are 15m–20m long, although shorter examples are known (Batey 1987: 290; Graham-Campbell and Batey 1998: 160–73, 188–96). Longhouses in Shetland have similar or even greater dimensions (Stumann Hansen 2000). Icelandic houses are rarely less than 15m long (*e.g*. Einarsson 1995; 2003; Vésteinsson 2004; Magnússon 1983; Nordahl 1988).

In contrast, the Cille Pheadair houses are much smaller. Allowing for the thickness of the turf walls, Houses 700 and 312 were under 11m long, House 500's Stage II 11m long, and House 007 just over 9m long. The exception is House 500 with its back room, measuring around 16m, although its main room and walls would only have been just over 12m long if the back room is excluded. Four of the Late Norse houses at Bornais are similarly small, single-roomed buildings less than 15m long (Sharples 2000: figs 3 and 4; 2005: fig. 36; Parker Pearson *et al*. 2004: fig. 74) but House 2, at 20m long internally, is of a different order of magnitude (Sharples 2004: 258–9; forthcoming). Similarly, the Viking Age Drimore longhouse measured 14m long internally, though there are problems (noted above) with accepting this plan at face value.

The Norse-period houses of Dublin and elsewhere in Ireland are, on the whole, small buildings, comparable in internal length to the Uist dwellings (Lynn 1994). Those from tenth/eleventh-century Dublin are typically 6m–10m long by 4m–6m wide. Their thin, wickerwork walls permit comparison only in terms of internal space. Nevertheless, it is apparent that length/width ratios of the Dublin houses are very different to the narrower Uist longhouses, and their internal use of space also differs. With a central hearth, the 'Type 1' houses have a tripartite arrangement of a central zone with beds against the walls and smaller spaces in the two gable ends (Wallace 1992; Simpson 1996). In contrast, the Cille Pheadair longhouse hall rooms have more of a dual structure, the hearth zone with beds, sitting area and craft-working zone making up one area, with a second area towards the doorway at the other end of the room.

The study of house floors at Cille Pheadair and Bornais has allowed detailed analyses of the patterns of refuse distribution and hence the spatial arrangements of activities (Smith *et al*. 1998). This even permits speculative discussion of gender relationships and household dynamics in terms of who was sitting where (see also Sharples 2005d: 185–7). The soft peat and sand floors of machair-located dwellings of all periods have acted fortuitously as 'traps' for tiny artefacts and other material residues, retrievable by intensive sampling, in ways that are often not possible on harder floor surfaces elsewhere in Britain and Europe. It is thus difficult to find comparable data for distributions of artefacts across the floors of Norse houses because quantities of finds from other sites are too low for meaningful analysis.

However, studies of micro-debris, geochemical distributions and soil micromorphology are beginning to reveal high levels of detail in the uses of domestic space, such as is revealed by Karen Milek's study of a Viking house at Aðalstræti 14–18 in Reykjavik (2006). Similarly fine-grained analyses are also possible by examining beetle fauna from different areas within Norse house floors preserved within permafrost in Greenland (Buckland *et al*. 1993). Studies of finds distributions within dwellings have also been possible at Sandwick, Shetland (Bigelow 1985) and Hofstaðir, Iceland (Lucas 2009; 2011).

For many of the Norse-period settlements in western and northern Scotland, the archaeologist is fortunate to recover simply house plans and interior arrangements of furniture and other non-movable items; the machair-built longhouses of Viking and Late Norse South Uist have enabled us to develop and deploy multi-disciplinary and integrated scientific methods to examine the house interiors and the associated deposits such as middens at an extraordinary level of detail, bringing us ever closer to the people themselves and how they lived.

Notes

1 Recent publications on the Isle of Man and the Hebrides include Beuermann 2010; 2012; Waerdahl 2010; Thomas 2012; Imsen 2014; Oram and Adderley 2010; Hudson 2015; Power 2015; Crawford 2015; Woolf 2015; and Duffy and Mytums 2015.

2 I have made a plea on several occasions for more inter-disciplinary research to be focused on individual islands, which provide obvious defined territorial units for settlement (Crawford 1987; 1995; 2005). Better awareness of socio-economic factors on such islands may help our understanding of the whole morphology of Norse settlement. Note the comment in Parker Pearson *et al*. (2004a: 144) about the evidence for different identities, even within South Uist.

3 Eldjarn expresses doubt, however, as to whether these graves can be used as evidence for settlement (1984: 8).

4 The term *plurimarum rex insularum* was used by Florence of Worcester in the twelfth century, although the event and the gathering of six kings is recorded in the *Anglo-Saxon Chronicles sub* 973 (Swanton 2000: 119).

5 The replacement of the ounceland (*tirunga* in the Hebrides) by the term davach (Gaelic *dabhach*) in the post-Norse period has been *proposed* by Gareth Williams (2003: 17–32), but see Ross 2015.

6 He is described by Etchingham (2001: 154–5) as 'a most significant figure whose role has not been adequately appreciated'. See Hudson 2005: 128–30 for a full description of the evidence for his existence.

7 There is a hint in a Norwegian source that Jarl Hakon of Lade (the family whose power base was in Trondheim, and who were the Danish kings' representatives in Norway in opposition to the royal dynasty) had been given power in the Hebrides in the 1020s at the time when he held the English earldom of Worcester from Cnut (see discussion in Crawford 1999: 118;

Hudson 2005: 131–2). Jarl Hakon was drowned in 1029 in the Pentland Firth and Iehmarc might therefore have replaced him as Cnut's man in the Hebrides in 1031.

8 The coin of Cnut, minted in York, deposited in phase 6 (see Chapter 13.17), is a remarkable indicator of contact with the Anglo-Scandinavian world. It can never be known how it reached Cille Pheadair, but one can point to occasions such as Iemarc/Echmarcach's meeting with Cnut in Scotland in 1031 (when English silver was most likely involved in persuading the king of the Hebrides to submit), as providing plausible circumstances for explaining the arrival of such coins in the Hebrides and their distribution thereafter among farmer/mercenaries who might very probably have served in Echmarcach's following. The discovery of this coin in a later context than early twelfth-century Minety ware suggests that it had been circulating for a century or more before being lost; maybe it was kept for its potential use as bullion when the need might arise.

9 There may also have been some concern for the situation in Orkney after the death of Thorfinn, if he died as early as 1058, as has been suggested recently (Thomson 2012).

10 It is said in Magnus' own saga that he set Sigurd as 'chief' over the Orkneys, and then, after his marriage to the Irish princess, he 'gave his son the title of king, and set him over the Orkneys and Hebudes' (*Magnus Barefoot's Saga* chaps ix and xii; Sturluson 1964: 261, 264).

11 Versified translation by Samuel Laing in his translation of Snorri Sturluson's *Heimskringla: the sagas of the Norse kings* (Sturluson 1964 vol. II: 261).

12 *Lék of Ljóðhús fíkjum/ limsorg náar himni,/ vítt vas ferð á flótta/ fús; gaus eldr fór húsum.* A more literal translation (Anderson 1922 vol. II: 106) is 'The branch-scorcher played greedily up into the sky, in Lewis; there was far and wide an eager going into flight. Flame spouted from the houses'.

13 *Orr skøldungr fór eldi/ Ívist, búendr misstu,/ róggeisla vann ræsir/ rauðan, lífs ok auðar.* 'The active king ravaged Uist with fire. The king made red the ray of battle. The farmers lost life and wealth' (Anderson 1922 vol. II: 106); 'next he plundered in Uist, and burned there, and robbed all the treasure' (*Magnus Barelegs' Saga* ch. 20, quoted in Anderson 1922 vol. II: n. 7: 106).

14 The *Chronicles of the Kings of Man and the Isles* (f.34r) tell about a certain Ingimund who was sent ahead by King Magnus to 'seize the kingdom of the Isles'; his base was Lewis where it seems he assembled the chieftains of the Isles and tried to make himself king. This did not go down very well and Ingimund was attacked by night and his house set on fire; he and all his men were killed. An incident like this may well account for the wrathful attack on the islands which Magnus then inflicted the following year (Beuermann 2002: 40).

15 The question of whether the kings of Norway received any renders from the Hebrides is exceedingly uncertain. There is no direct evidence of any such tribute, except for that paid by kings of Man on their accession (see Crawford 2014: 70–3).

16 The walrus ivory chess pieces found near Uig on the west coast of Lewis are dramatic visual proof of cultural contacts with Norway in the twelfth century (they are dated to the late twelfth century) (Caldwell and Hall 2014). The quality of this hidden treasure suggests contacts at the highest level, and it would not be irrelevant to indicate the recorded events such as Godred's visit, or the inclusion of the Sudreys within the new archbishopric, as occasions when high-status gifts such as the chess pieces might have been sent or taken back to the kingdom of Man, although they never reached their destination.

17 As is asked by Parker Pearson *et al*. (2004: 158) 'Why and when did Howmore become an important centre?'. See Raven 2005: 173–8 for a discussion of its structural development.

18 The finest evidence for Norse Christian influence in the whole group of islands is the cross slab with runic inscription at Kilbar, Barra. This probably dates to the second half of the tenth century (Fisher 2001: 106–7, no. 41).

19 The Norwegian *skattländer* comprised all the lands west-over-sea and in the north Atlantic settled by Norse speakers (as well as Jämtland on the frontier with Sweden), which were brought under the direct authority of the Norwegian crown and paid a regular tax or, in the case of Man, an irregular tribute on the accession of each king (Crawford 2015: 229: Imsen 2010 and contributions on the different skattlands in Imsen 2014).

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Cille Pheadair is one of more than 20 Viking Age and Late Norse settlements discovered on the island of South Uist in the Outer Hebrides (Western Isles), off the west coast of Scotland. Its unusually well-preserved stratigraphic sequence of nine phases of occupation, including five longhouses and many smaller buildings, provides a remarkable insight into daily life on a Norse farmstead during two centuries of near-continuous occupation *c.* AD 1000–1200. Although the excavation at Cille Pheadair was a rescue project undertaken before the site was destroyed by coastal erosion, it provided an opportunity to address important research questions about the domestic use of space, agricultural economy, and relationships with the wider world beyond the Outer Hebrides. Careful and ground-breaking analysis of preserved house floors provided profound insights into the changing use of space within a Norse longhouse and its surrounding outbuildings. The rich assemblage of pottery, ironwork, gold and silver reveals that the inhabitants of Cille Pheadair had long-distance connections across the Viking world. A battery of scientific studies, including faunal and floral analyses, isotopic and lipid residue analyses, and soil chemistry, have revealed much about the social and economic dimensions of life on a Norse farm. Detailed survey and excavation in South Uist reveals a remarkable picture of Norse-period settlement across this island which was part of the insular Viking world between Ireland and Norway, becoming part of the Kingdom of Man and later the Kingdom of the Isles. Cille Pheadair's status as an ordinary, if wealthy, farmstead can be contrasted with the much larger and longer-lived high-status settlement at Bornais to the north. The two sites together provide a fascinating insight into similarities and differences within the settlement hierarchy of the time that makes a significant contribution to our understanding of the Viking world.

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